APPENDIX H

INTERFACE CONTROL DOCUMENT FOR THE

PERFORMANCE MEASUREMENT TEST EQUIPMENT (PTE)

AND THE USS SUBSYSTEM CONTROLLER (SSC)/USS ADPE

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SECTION H1
INTRODUCTION

H1.1 PURPOSE

The purpose of this document is to provide a detailed definition of the interface between the Performance Measurement Test Equipment (PTE) and the USS Subsystem Controller (SSC)/USS ADPE.

H1.2 SCOPE

This Interface Control Document (ICD) defines and controls the applications functions, communications protocol, messages, message formats, and the electrical and mechanical characteristics of the interface between the PTE and the USS SSC/ADPE.

SECTION H2
APPLICABLE DOCUMENTS

H2.1 GENERAL

The following documents, are part of this specification to the extent cited herein.

H2.2 SPECIFICATIONS

STGT - HE - 06 - 01, 9/90	HW/SW Interface Document

H2.3 STANDARDS

MIL - STD - 1553B, 9/86 through Notice 2	Aircraft Internal Time Division Command/Response Multiplex Data Bus

SECTION H3
SYSTEM DESCRIPTIONS

H3.1 GENERAL

This section provides background information on the functions of the PTE .

H3.2 PERFORMANCE TEST EQUIPMENT (PTE) DESCRIPTION

H3.2.1 FUNCTIONAL OVERVIEW

The PTE provides test signals required to support pre - service, post - maintenance, and end - to - end test verification of the associated USS equipment chains. The essential functions of this unit are:

Return Services:

a. Baseband test signal generation

b. Convolutional encoding of baseband test data

c. Symbol formatting

d. PN Spreading

e. IF carrier generation

f. Doppler compensation of test data

g. Noise generation

h. BER measurements

Forward Services:

a. Data and clock signal generation

b. Processing of IF signals to baseband

c. Demodulation of IF test signals

d. Despreading of IF test signals

e. Symbol Clock recovery from demodulated and despread data

f. Convolutional decoding

g. BER measurements

Return End - to - End Test Services:

a. Receive baseband test data from DIS

b. Generation of baseband test data

c. Data formatting of NRZ - L data

d. BER measurement of self generated data.

Forward End - to - End Test Services:

a. Receive EET IF signals for processing to baseband

b. Return Data Delay Measurement support

The PTE consists of a test modem plus three Bit Error Rate Test Sets (BERTs), an E_b/N_o Test Set, and two Time Interval Counters (TICs). The SSC communicates with the test modem over the 1553B interface described in this appendix. The test modem communicates with the remaining test equipment over an IEEE - 488 bus defined by IEC. Figure H3 - 1a shows the configuration of the components that make - up the PTE; Figure H3 - 1b is a functional diagram of the test modem alone.

H3.2.2 (NOT USED)

H3.2.3 LRU DESCRIPTIONS

a. Modem Control Processor (MCP) LRU

Is a 25 MHz 68030 processor based VME bus controller, 1 MB zero wait state static RAM, and four EPROM sockets

b. IEEE - 488 LRU

The IEEE - 488 LRU provides the interface between the MCP and the IEEE - 488 bus. This includes full capabilities of a 488 controller and VMEbus compatible DMA functions.

c. TIMING GENERATORS (TIME) NUMBERS 1 AND 2

The Test Modem contains two identical TIME LRUs. Each TIME LRU has the following capabilities:

- Provides time - of - year data (seconds, minutes, hours, and days) from the input serial IRIG - B data. (Time No. 1 only)
- Provides a microprocessor controlled 1553 interface.
- Provides timing interrupts from the 1 PPS and 50 MHz signals and accept masking of any or all of these interrupts.
- Provides two Numerically Controlled Oscillators adjustable by microprocessor control.
- Provides control/status communication between the RF modules and the MCP.
- Provides an analog voltage measurement of various power sources upon microprocessor command. (Time No. 1 only)

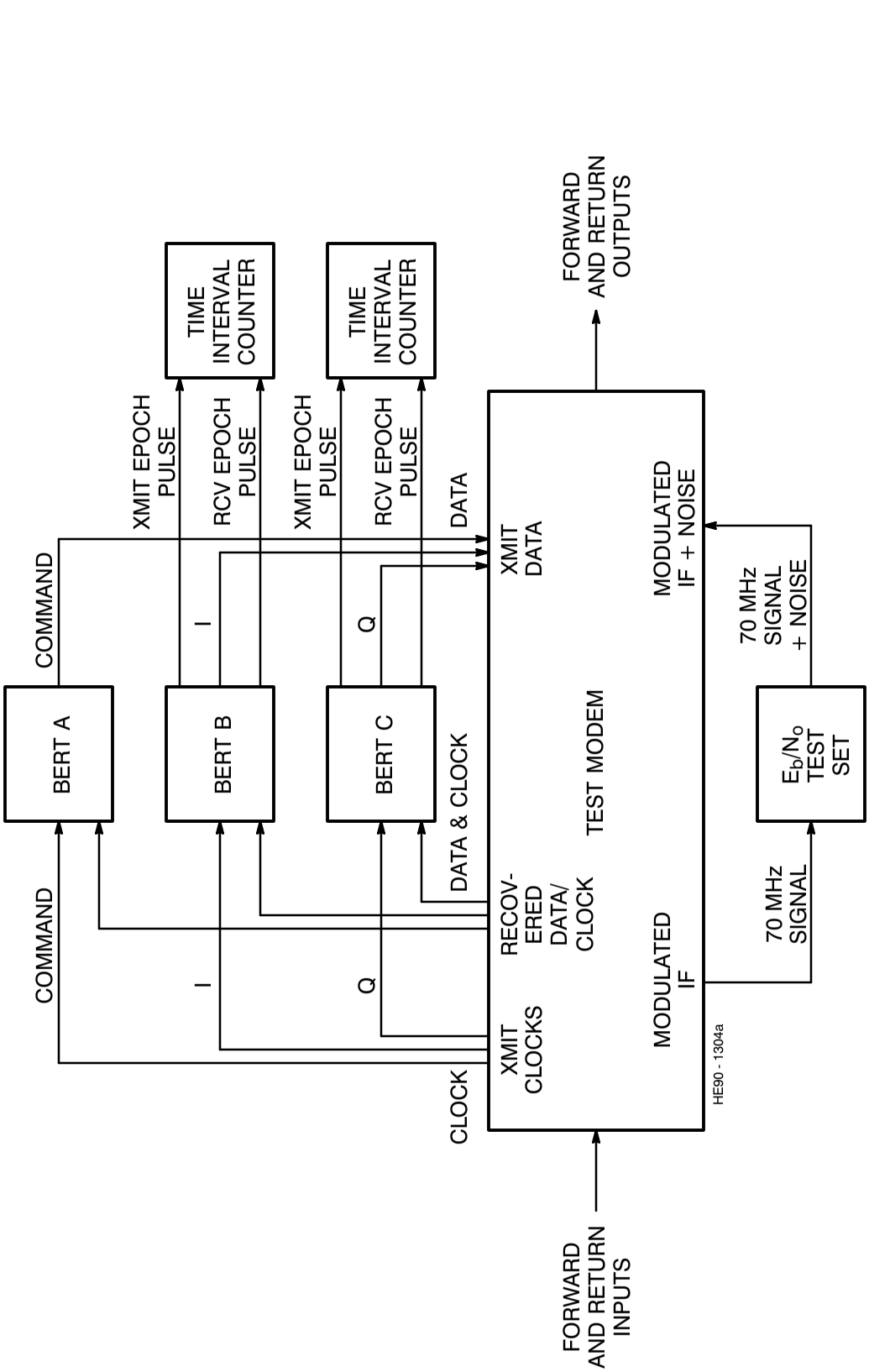

Figure H3–1a. PTE Configuration

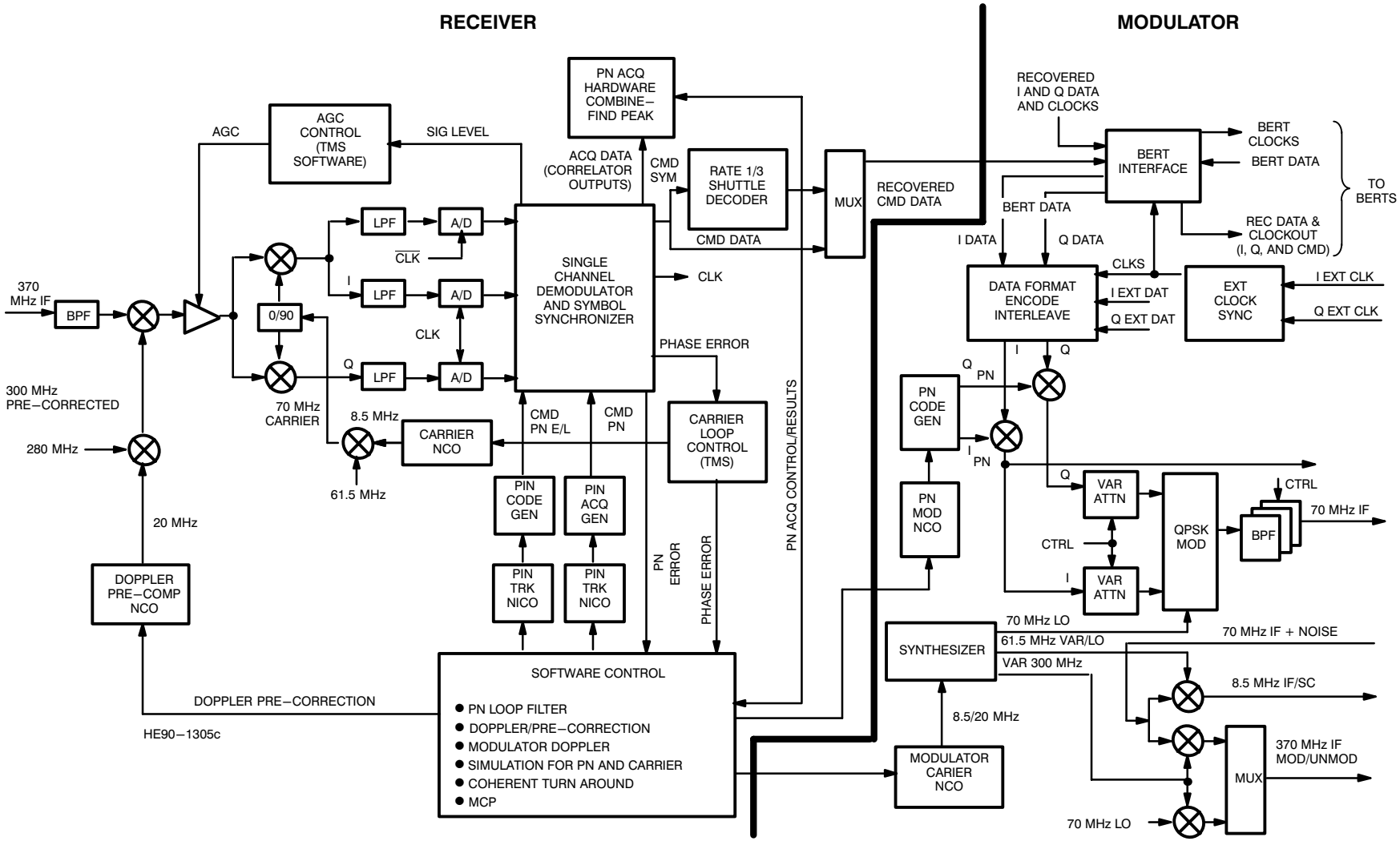

Figure H3−1b. Test Modem Functional Diagram

d. TEST DATA INTERFACE (TDIF) LRU

The test data interface performs return data format conversion, provides convolutional encoding, interleaving and cover sequence symbol format conversion and return PN spreading. It also generates data and symbol clocks, allows for external jitter clock inputs, and interfaces to the BIT error test units. It also provides DACs for TMOD power ratio control.

e. ACQUISITION PROCESSOR (ACQ) LRU

The Acquisition processor:

- Communicates with the MCP over the VMEbus
- Provides coherent combine of formatted correlator data on command
- Provides coherent channel combine of formatted correlator data
- Provides non - coherent combine
- Provides non - coherent channel combine
- Finds and saves the peak magnitude and index of the combined correlator data, and supplies to the MCP.

f. PN CODE PROCESSOR (PNP) LRU

The PN Processor:

- Generates PN codes compatible with TDRSS services
- Generates two I and Q code strings one for acquisition and one for track
- Continues an acquisition code generator for step search control and acquisition accumulator control
- Continues a track code generator for early, on time, and late replica PN code strings

g. DEMOD PROCESSOR (DMDP) LRU

The DMDP consists of a Digital Signal Processor (DSP), and FFT Controller (FFTC), and the associated hardware to perform the following functions under firmware direction:

- Communicate with the Modem Control Processor (MCP).
- Control signal tracking loops as required by the application. This involves using a Fast Fourier Transform (FFT) process to acquire the carrier, and second - and third - order digital phase - locked loops to track it. Control information is sent to, and status and data received from, the Demod Symbol Synchronizer (DMSS).
- Provide non - coherent Automatic Gain Control (AGC) and dc - bias compensation to maintain proper signal input levels from the rf section of the unit to the digital processing section.
- Send control information to the Output Processor, to direct the decoding and autotrack functions.

h. DEMOD/SYMBOL SYNCHRONIZER (DMSS) LRU

The demod symbol synchronizer:

- Communicate with the DMDP over the TMS BUS
- Filters the I and Q data from the RF modules
- Provides two 2 - bit variable length correlators
- Provides symbol/data recovery
- Provides an 8.5 $\pm$ 0.5 MHz carrier L.O.

i. RF DOWNCONVERTER NO. 2 (RFDC3) LRU

[Note: The test modem does not contain an RFDC1 or RFDC2]

The RFDC3 accepts a 370 MHz IF input and downconverts it to 70 MHz. The leveled 70 MHz IF is then quadrature downconverted to produce baseband I and Q. These are then lowpass filtered and quantitized. The quantitizer outputs are then sent to the DMSS.

j. SYNTHESIZER (SYNTH) LRU

The test mode m contains two identical SYNTH LRUs. SYNTH No. 1 supports the demod function of the mode; SYNTH No. 2 supports the modulator function. Each SYNTH LRU uses the externally provided 10 MHz frequency reference signal to provide all of the clocks required by the modules of the PTE.

k. TEST MODULATOR (TMOD) LRU - The TMOD LRU takes unmodulated I and Q data and UQPSK modulates them using a 70 MHz LO. The signal can then be routed to the E_b/N_o test set, and then split for output at either 8.5 MHz or 370 MHz.

l. EXTERNAL CLOCK SYNCHRONIZER (EXCS) LRU - The EXCS synchronizes to the externally supplied data clock when the PTE is using simulated user return data supplied by the DIS during POCC - driven end - to - end test.

m. POWER SUPPLIES (PS1 AND PS2)

PS1 - This Power Supply supplies $\pm$15 volts, + 5 volts for logic, and separate +5 volts for RF to the following modules:

RFDC3	ACQP	MCP	TMOD
SYNTH	DMDP	PNP	IEEE - 488
TIME	DMSS	TDIF	

PS2 - This Power Supply supplies - 5.2 volts and $\pm$12 volts to the following modules:

DMSS	TIME	TMOD
RFDC3		
SYNTH	TDIF	

n. E_b/N_o LRU - The E_b/N_o LRU is a HP3708A noise and interference test set which is capable of adding a controlled amount of noise to RF test signals to establish precise E_b/N_o conditions.

o. BERT (CMD) LRU - The BERT (CMD) LRU is a AYDIN Model 604MI BIT Error Rate tester which measures BER over the range of 10 BITs/sec to 25 Mbits/sec on the Forward Command channel.

p. BERT (I) LRU - The BERT (I) LRU is a AYDIN Model 604MI BIT Error Rate tester which measures BER over the range of 10 BITs/sec to 25 Mbits/sec on the Return I channel.

q. BERT (Q) LRU - The BERT (Q) LRU is a AYDIN Model 604MI BIT Error Rate tester which measures BER over the range of 10 BITs/sec to 25 Mbits/sec on the Return Q channel.

r. I - CHANNEL TIME INTERVAL COUNTER (TIC) LRU

The I TIC is a Hewlett - Packard 5316B counter used in conjunction with the I BERT set for making I - channel return data delay measurements.

s. Q - CHANNEL TIME INTERVAL COUNTER (TIC) LRU

The Q TIC is a Hewlett - Packard 5316B counter used in conjunction with the Q BERT set for making Q - channel return data delay measurements.

H3.2.4 CRITICAL PERFORMANCE STATUS DESCRIPTION

a. E_b/N_o - The E_b/N_o measurement is based on the signal magnitude and the noise magnitude in the Demod ASIC. The possible range of values is - 45.0 dB to +65.0 dB with a resolution of 0.1 dB. The E_b/N_o values will be collected every 10ms and averaged over the last 1 second interval.

b. Range - The range measurement is the delta from the ephemeris profile. The measurement will have a resolution of 1 ns.

c. Integrated Doppler Frequency - The residual doppler frequency measurement from the Carrier Loop output. The measurement will be the total integrated doppler over the last 1 second interval. The doppler measurement will be zeroed initially upon phase lock.

d. AGC Status - An indication of the operating level of the Non - coherent AGC at the RFDC and the Data AGC at the Demod ASIC. When the circuit is operating outside of the AGC range, an over/under limit indication will occur.

H3.2.5 BUILT–IN TEST OVERVIEW

a. CONFIDENCE BIT - The Confidence BIT is performed on all LRUs except: RFDC3, SYNTH (DMD), SYNTH (MOD), TMOD, EBNO, BERT (X3), TIC (X2). This function consists of the following test groups:

1. Test CPU
2. Test VME
3. Test Environment
4. Test DEMOD ASIC
5. Test RAM
6. Test DMDP
7. Test 1553
8. Test Indicators

The Confidence BIT is executed upon power - up or upon command via the 1553.

b. ONLINE BIT - The Online BIT is performed on all LRUs except: TDIF, ACQ, PNP, DMSS, RFDC3, TMOD, EXCS. This function consists of the following monitor groups:

1. Monitor ALC Levels
2. Monitor Synth Lock
3. Monitor 1 PPS
4. Monitor Environment
5. Monitor Time
6. Monitor IEEE - 488
7. Monitor TMS Status
8. Monitor CPU Exception
9. Monitor Signal Levels (Done once after each dc bias calibration)

An Online BIT is run as a continuous process during all active PTE states.

c. EXTENDED BIT - This function consists of the following test groups:

1. TEST MCP

LRUs Tested - MCP, TIME_DEMOD

Pass/Fail Criteria - The MCP test will pass if each MCP subset passes. If any of the MCP subtests fail, the MCP test will also fail.

This MCP test subprocess consists of the following subtests:

68030 TEST

PIT TEST

MCP Subtest Descriptions:

68030 Test - This subtest verifies operation of the 68030 MCP processor. The 68030 functions tested include the following:

Internal register operation
Addressing modes
Instruction set operation
Exception processing

This subtest will fail is any of the tested functions are not operating as expected.

PIT TEST - This subtest verifies operation of the two MCP PITS. This subtest tests the PIT's registers, timers, and interrupts. The registers are tested by writing and reading a test word to/from each register and verifying that the word read from the register is the same as the word written to the register. The two PIT timers are tested by comparing their measurement of a short period of time. This subtest will fail if a register data write/read is inconsistent, or if the PIT timers do not measure a period of time within +/- 5 percent of each other, or if the PIT interrupts do not occur.

2. TEST_VME

LRUs Tested - DMDP, I488, TDIF, ACQR, PNP, EXCS

Pass/Fail Criteria: The VME test will pass if each VME LRU can be written to and/or read from without error. If a write/read error is detected with any other VME LRUs, this test will fail.

This VME test subprocess verifies operation of the VME data transfer bus. A test data word is written to and/or read from each of the VME slave LRUs, as listed under "LRUs Tested". If a bus exception occurs during LRU access, this test will fail. On those LRUs that have a write/read capability, a test word written to the LRU is compared to the test word read from the LRU. If the test data words do not compare this VME bus will fail.

3. TEST_TIME

LRUs Tested - TIME_DEMOD

Pass/Fail Criteria: The TIME test will pass if each of its four timing interrupts (1, 10, 100, and 1000 PPS) occur within a reasonable tolerance, and the 6.2V reference is within a reasonable tolerance. Otherwise, if any of these measurements are out of tolerance, this test will fail. Also, if resynchronization is in progress and no external 1 PPS signal is present this test will fail due to lack of time interrupts.

This test verifies the following functions of the TIME LRU:

Timing interrupts

5V A/D converter

The intervals of each of the TIME LRU's timing interrupts are measured by a PIT counter and verified to be within a reasonable tolerance of the nominal time period.

The reference 6.2V input to TIME LRU's A/D converter is converted to a digital representation and verified to be within a reasonable tolerance of nominal 6.2 volts.

4. TEST_DMDP

   LRUS TESTED - DMDP

   Pass/Fail Criteria: The DMDP test will pass if each DMDP subtest passes. If any of the DMDP subtests fail, the DMDP test will also fail.

   The DMDP test subprocess consists of the following subtests:

   DMDP SELFTEST

   DPRAM TEST

5. TEST_DEMOD_ASIC

   LRUs Tested - DMSS

   Pass/Fail Criteria: The demodulator ASIC test will pass if each signature subtest produces its expected output. Otherwise, any unexpected signature test result will cause this test to fail.

   The MCP controls the DMDP by sending the TEST_DEMOD_ASIC_CMD.

   After all of the signature tests have been completed, the TMS returns the ASIC test results in TEST_DEMOD_ASIC_RESULT, indicating test completion to the MCP by means of STATUS_UPDATE.

6. TEST_SIGNAL_LEVELS

   LRUs Tested - TIME_DEMOD, RFDC3, DMSS, DMDP, PNP

   Pass/Fail Criteria: The signal Levels test will pass if the new DC bias has not changed significantly from the previous DC bias.

   The Signal Levels test verifies that a DC bias can be compensated for, and that the rms I and Q signal levels are within $\pm$ 5% of each other, when measuring a test signal. This test verifies the signal levels through three data paths in the PTE.

   The MCP selects a 70 MHz test signal and commands the TMS processor to perform a DC bias procedure. The MCP then verifies that the new bias values have not varied more than a reasonable amount from their previous values.

MCP then configures the TMS processor for a carrier NCO offset of 10,000 Hz from its 8.5 MHz frequency, with a sample rate of 5 Hz bin width. The MCP commands the TMS processor to acquire and after acquisition is achieved, reads the rms magnitude of the I and Q signals from the TMS processor. The I and Q signal magnitudes are compared by the MCP to determine test result as defined above.

7. TEST_PNP

   1. TEST_PNP

      LRUs Tested - PNP, TIME_DEMOD

      Pass/Fail Criteria: This PNP test will pass if epoch interrupts occur when expected within a reasonable time interval, and if epoch PN codes are as expected.

8. TEST_CORRELATOR_TAP

   LRUs Tested - DMSS, ACQR, PNP

   Pass/Fail Criteria: This correlator tap test will pass if each of four selected taps yield expected peak indices and bin magnitudes, and if a peak detect interrupt occurs within a reasonable period of time. Unexpected peak indices, bin magnitudes or peak detect interrupts will cause this test to fail.

9. TEST_TDIF

   LRUs tested - TDIF, TIME_MOD

   Pass/Fail Criteria: This TDIF test will pass if epoch interrupts occur when expected within a reasonable time interval, and if epoch PN codes are as expected. Otherwise, if any sampled PN codes are not as expected, or if an epoch interrupt does not occur or occurs outside of the reasonable time interval, this test will fail.

   This TDIF test configures the TDIF LRU to generate PN codes, and cause an interrupt at epoch occurrence. The PN codes at the epoch are sampled to verify their values. Acquisition and Track epoch interrupts are timed to verify that they occur within a reasonable time interval.

10. TEST_I488_CONTROLLER - This function consists of the following tests:

    LRUs Tested - I488

    Pass/Fail Criteria: This test will pass if all tested functions of the IEEE_488 LRU are operating as expected. Otherwise, if any of the tested IEEE - 488 LRU functions are not operating as expected, then this test will fail.

    This test of the IEEE - 488 LRU verifies operation of the following functions:

    I488 Reset
    I488 DMAC register operation

IEEE - 488 controller operation
I488 DMAC error handling
I488 DMAC interrupt generation
I488 DMAC data transfer
I488 DMAC carry cycle I/O

11. TEST_I488_INSTRUMENTS

LRUs Tested - EBNO, BERT C, BERT I, BERT Q, TIC I, TIC Q.

Pass/Fail Criteria: This IEEE - 488 instruments test will pass if each of the IEEE - 488 instruments pass their built - in self - tests, and can be configured without error. If any instrument fails its self - test, or cannot be configured without error, this test will fail.

The IEEE - 488 instruments test verifies that each instrument does not indicate a failure condition either before or after self - test or configuration processing.

12. TEST_RF_LOOPBACK - This function consists of the following:

LRUs Tested - TMOD, TIME_MOD, TDIF, EBNO, EXCS

Pass/Fail Criteria: This RF loopback test will pass if the receiver portion of the Test Modem is able to acquire the track signal transmitted by the modulator portion of the Test Modem. The level of the received signal and the bit error rate must both be within reasonable ranges. This test will fail if the receiver section of the Test Modem is unable to acquire and track the transmitted signal or if the received signal or bit error rate is not within reasonable ranges.

This test configures the Test Modem into a closed loop mode. The TDIF and PNP code generators are set to the same code and the TMOD output and RFDC input set to the same frequency. The performance of the receiver section is evaluated as per the above criteria to determine test result.

SECTION H4
INTERFACE CONFIGURATION AND CONTROL

Figure H4 - 1 illustrates the configuration of the PTE - SSC/ADPE interface and the interactions that are defined. The PTE and the USS ADPE interact directly at the user levels (interactions 1 through 3). The SSC provides the interfacing medium for the transport service levels (interactions 4 through 14). Requirements allocations for each of the 14 interactions are shown in Table H4 - 1.

TABLE H4 - 1. REQUIREMENTS ALLOCATION

Interaction Number (Figure H4 - 1)	Unit		
	PTE	SSC	ADPE
1	X		X
2	X		X
3	X		X
4	X	X	
5		X	X
6	X	X	
7	X	X	
8 - 13		X	X
14	X	X	

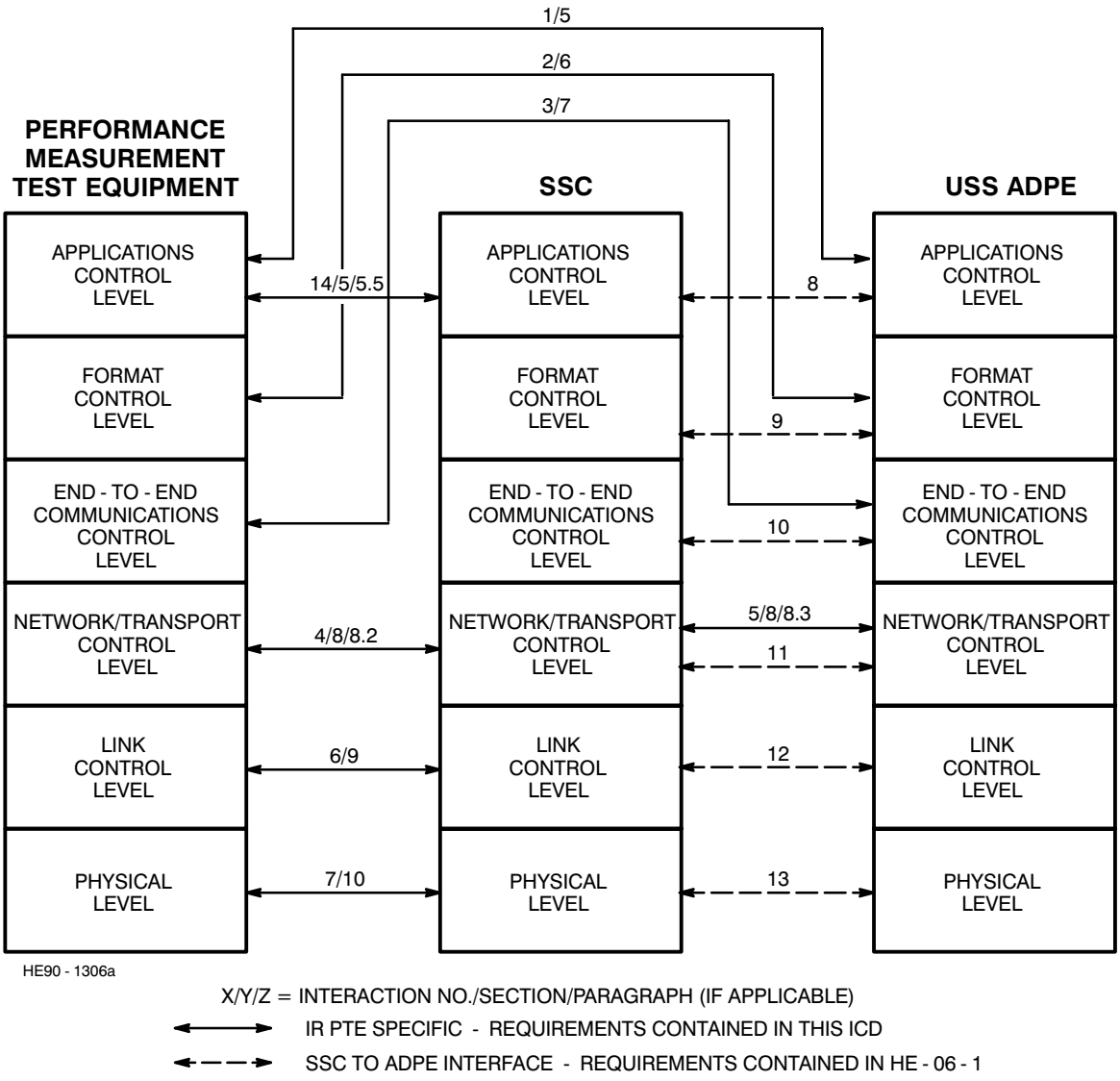

Figure H4 - 1. PTE - SSC/ADPE Interface

SECTION H5
APPLICATIONS CONTROL LEVEL

H5.1 GENERAL

This section describes the PTE - SSC/ADPE interface at the Applications Control Level (interaction 1 of Figure H4 - 1).

H5.2 PTE COMMANDING

H5.2.1 TIME DEFINITIONS

Effective Time shall be defined as the exact 1pps time that command execution shall initiate for synchronous commands.

Execution Time shall be defined as the maximum time that a command takes to complete its function.

Setup Time shall be defined as the maximum time required to prepare for execution of a synchronous command.

Initiation Time shall be defined as the Effective Time for synchronous commands, and the actual implementation time for asynchronous commands.

H5.2.2 SYNCHRONOUS COMMANDS

Synchronous commands shall be defined as commands which contain an effective time, so that command execution may be time synchronized with other units.

Table H5 - 1 shows the setup and execution time for each of the commands.

The effective time shall take place on the 1 pps of the time specified in the time field of command. The execution time is measured from the effective time. For commands that are to be completed and latched at the 1 pps, execution time is specified as zero. Setup time is defined as 1 second for all synchronous commands. Figure H5 - 1 shows a pictorial representation of these times.

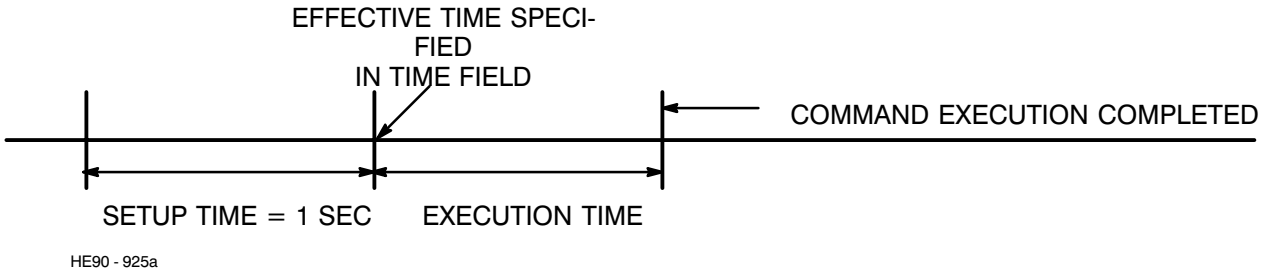

Figure H5 - 1. Time Definitions

The Test Modem shall be capable of accepting and executing both a PTE_MODULATOR_START_SERVICE command and a PTE_DEMOD_START_PN_MODEL command with the same effective time. Except for this case, the unit is not required to execute more than one synchronous command per effective time.

H5.2.3 ASYNCHRONOUS COMMANDS

Asynchronous commands are defined as commands that do not contain an effective time. They are executed as soon as possible from time of receipt, such that the maximum execution time allowed for completion of the command does not exceed the execution time specified in Table H5 - 1. The execution time for an asynchronous command shall be specified from time of receipt at the unit.

The **maximum command rate** (maximum commands per second) for any given asynchronous command is defined as 1/Execution Time. Should this rate be exceeded, the unit shall not malfunction or lock - up. The unit may overwrite the previous command of the same type.

No more than 4 asynchronous commands may be sent to the unit in any 1 second period.

TABLE H5 - 1. SETUP AND EXECUTION TIMES

Command	Sync / Async	PTE	
		Setup Time	Execution Time
Set State	A	N/A	1
Config. General	A	N/A	2
Common Config (PTE Demod)	A	N/A	6
Specific Config (PTE Demod)	A	N/A	6
Specific Config (PTE modulator)	A	N/A	10
Start Acquisition (PTE Demod)	A	N/A	1
Start Service (PTE Demod)	S	1	0
Start BER (FWD and RTN)	A	N/A	1
Measure Time Interval (PTE Modulator)	A	N/A	1
Start PN Model (PTE Demod)	S	1	0
Range Channel Reacq (PTE Demod)	A	N/A	1
Download - N/A			
Ephemeris Data - N/A			

H5.2.4 PTE COMMAND AND OPERATING STATES

H5.2.4.1 General

The PTE operating states are described within two major MODEM operating modes. These modes are the PTE COHERENT mode and the PTE NON - COHERENT mode (not to be confused with coherent and non - coherent services).

The PTE NON - COHERENT mode describes the operational mode where the PTE Modulator and the PTE demodulator are treated as two individual units. The frequency sources (local oscillators (LO)) between the modulator and demodulator are independent of each other. This mode is used during preservice test of forward and return chains, and non - coherent End - to - End Test services.

The PTE COHERENT mode describes the operational mode where the PTE Modulator frequency source is coherently related to the PTE Demodulator frequency source. This mode is used during coherent End - to - End Tests.

Within the two PTE modes, there are several state diagrams. In the PTE NON - COHERENT mode, there are the Demodulator Receiver States, and the Modulator States. In the PTE coherent mode, there is only one state diagram describing the Coherent States.

The Demodulator Receiver States pertain to the receiver portion of the PTE.

The Modulator States describe the states of the modulator portion of the PTE.

Finally, for the PTE COHERENT mode, the Coherent state diagram describes the state transitions showing the modulator and demodulator integrated and operated as a single unit. The ADPE must specify to the PTE (which mode PTE coherent or PTE non - coherent) by use of the General Configuration Command prior to sending any other configuration command which would cause a state change.

H5.2.4.2 Common States

The common states are those states that are common to the Forward and Return states. Commands shall be accepted or executed in the states indicated in Tables H5 - 2a through H5 - 2 d. Tables H5 - 3a through H5 - 3d show the State Transition Table (STT) in terms of events and actions.These states are described as follows:

Confidence Test in Progress - This state shall be entered upon power - up or reset. During this state, the PTE will be executing its confidence test, and will not respond over the 1553b interface. This state will complete in less than 10 seconds. During this state, the TEST LED on the front panel will be set. If the confidence test fails, the FAULT LED on the front panel will be set.

Extended BIT - This state shall be entered by an Extended BIT command from either the front panel or 1553b, and exits either upon completion of the BIT or by termination of BIT by either front panel or 1553b command.

H5.2.4.3 PTE Demod States

The following paragraphs describe each of the states of the PTE demodulator. Commands shall be accepted or executed in the states indicated in Table H5 - 2a. Table H5 - 3a shows the PTE Demodulator State Transition Table (STT) in terms of events and actions. A simplified state transition diagram is illustrated in Figure H5 - 2.

Standby - This state shall be entered by completion of the confidence test, or by command via the 1553b interface. This state indicates that the PTE is ready to be configured.
Upon receipt of GENERAL, COMMON, and SPECIFIC CONFIGURATION COMMANDS, the PTE shall start configuration of the unit. Upon receipt of an Extended BIT command, the PTE shall begin automatic BIT.

Demod Configuration In Progress - This state shall indicate that the PTE is dedicated to return configuration of the unit. No other signal acquisition or tracking will be done while in this state. The PTE is configured as per the specific configuration command received via the 1553b interface. Upon completion of the configuration, the unit transitions to the state as described in the PTE STD (State Transition Diagram). This state will complete in less than 2 seconds.

Demod Configured - This state shall indicate that the PTE is ready to start the acquisition and tracking of the signal as specified by configuration.

Acquisition - This state shall indicate that the PTE is attempting to acquire the signal as configured. Any reconfiguration command during this state will transition the unit to Configuration in Progress. Upon achieving lock, the PTE will transition to the Tracking state.

Track - This state shall indicate that the PTE has achieved lock, and is tracking the signal as configured. This is the only state in which the Tracking Report data is valid. The PTE will stay in this state until a command requiring a state change is received (see PTE STD).

H5.2.4.4 Modulator States

The following paragraphs describe each of the Modulator States for the PTE modulator when in PTE NON - COHERENT mode. Commands shall be accepted or executed in the states indicated in Table H5 - 2 c. Table H5 - 3c shows the PTE Modulator State Transition Table (STT) in terms of events and actions. A simplified State Transition Diagram (STD) is illustrated in Figure H5 - 3.

Standby - This state shall be entered by the PTE Modulator upon completion of the confidence test, or by command via the 1553b interface. This state indicates that the PTE Modulator is ready

to be configured. Upon receipt of GENERAL and PTE MOD CONFIGURATION COMMANDS, the PTE shall start configuration of the modulator. Upon receipt of an Extended BIT command, the PTE shall begin automatic BIT.

Modulator Configuration In Progress - This state shall indicate that the PTE Modulator is dedicated to the modulator configuration of the unit.The PTE Modulator is configured as per PTE MOD CONFIGURATION COMMAND received via the 1553b interface. Upon completion of the configuration, the unit transitions to the state as described in the PTE Modulator STD (State Transition Diagram). This state will complete in less than 10 seconds.

Modulator Configured - This state shall indicate that the PTE has received the PTE MOD CONFIGURATION COMMAND and is ready to accept the START SERVICE COMMAND.

Modulator In Service - This state shall indicate that the PTE has received the START SERVICE COMMAND and has started the modulation.

H5.2.4.5 Coherent Mode States

The states described above are the same definitions as those shown in the COHERENT state diagrams. In the PTE Coherent Mode, these states interact slightly different. Commands shall be accepted or executed in the states indicated in Table H5 - 2 d. Table H5 - 3d shows the PTE State Transition Table (STT) in terms of events and actions. A simplified State Transition Diagram (STD) is illustrated in Figure H5 - 4.

TABLE H5 - 2a. PTE DEMOD COMMAND STATE TABLE (NON - COHERENT TURNAROUND PTE MODE)

Command \ State	Sync/ Async	Confidence Test	Extended Bit	Standby	Demod Configured	Demod Config. In Progress	Acqui– sition	Track
Set State Command	A							
- Reset			X	X	X	X	X	X
- Clear Ephem				X	X	X	X	X
- Clear Config				X	X	X	X	X
- Clear Both				X	X	X	X	X
- Start Extended BIT				X	X	X	X	X
- Stop Extended BIT			X					
Download (F/W)	N/A			X				
Download (Ephemeris)	N/A			X	X	X	X	X
General Config Cmd	A			X				
Demod Specific Config Cmd	A			X	X	X	X	X
Demod Common Config. Cmd	A			X	X	X	X	X
Start Acq	A				X	X		
Start FWD BER Test	A				X	X	X	X
Start PN Model	S				X			
Range Channel Reacquisition	A							X

NOTES:

1. The PTE_GENERAL_CONFIG_CMD, the DEMOD_COMMON_CONFIG_CMD, and the DEMOD_SPECIFIC_CONFIG_CMD must all be received in order to transition from Standby to Demod Configured.

TABLE H5 - 2b. (NOT USED)

TABLE H5 - 2c. PTE MODULATOR COMMAND STATE TABLE (NON - COHERENT TURNAROUND PTE MODE)

State / *Command*	*Sync/ Async*	*Confidence Test*	*Extended Bit*	*Standby*	*Mod Configured*	*Mod Config. In Progress*	*Mod In Service*
Set State Command	A						
- Reset			X	X	X	X	X
- Clear Ephem				X	X	X	X
- Clear Config				X	X	X	X
- Clear Both				X	X	X	X
- Start Extended BIT				X	X	X	X
- Stop Extended BIT			X				
Download (F/W)	N/A			X			
Download (Ephemeris)	N/A			X	X	X	X
General Config. Cmd	A			X			
Mod. Config. Cmd	A			X	X	X	X
Mod Start Service	S				X		X
Start RTN BER Test	A				X	X	X
Measure Time Interval	A				X	X	X

NOTES:

1. The PTE_GENERAL_CONFIG_CMD, and the MODULATOR_CONFIG_COMMAND, must be received in order to transition from Standby to Mod Configured.

TABLE H5 - 2d. PTE MODEM COMMAND STATE TABLE (COHERENT TURNAROUND PTE MODE)

Command \ State	Sync/ Async	Confidence Test	Extended Bit	Standby	Con– figured	Config. In Progress	Acquisi– tion	Track and In Service
Set State Command	A							
- Reset			X	X	X	X	X	X
- Clear Epdem				X	X	X	X	X
- Clear Config				X	X	X	X	X
- Clear Both				X	X	X	X	X
- Start Extended BIT				X	X	X	X	X
- Stop Extended BIT			X					
Download (F/W)	N/A			X				
Download (Ephemeris)	N/A			X	X	X	X	X
PTE General Config Cmd	A			X				
Demod Specific Config Cmd	A			X	X	X	X	X
Demod Common Config Cmd	A			X	X	X	X	X
Mod Config Cmd	A			X	X	X	X	X
Start Acq	A				X	X		
Start FWD BER Test	A				X	X	X	X
Start RTN BER Test	A				X	X	X	X
Start PN Model	S				X			
Range Channel Reacquisition	A							X
Measure Time Interval	A				X	X	X	X

NOTES:

1. The PTE_GENERAL_CONFIG_CMD, the DEMOD_SPECIFIC_CONFIG_CMD, the DEMOD_COMMON_CONFIG_COMMAND, and the MOD_CONFIG_COMMAND must all be received in order to transition from Standby to Configured.

TABLE H5 - 3a. PTE DEMOD STATE TRANSITION TABLE (NON - COHERENT TURNAROUND PTE MODE)

Current State	Event	Action	Next State
POWER OFF	Power - On	Boot Exec and Application Execute Confidence Test	CONFIDENCE TEST IN PROGRESS
CONFIDENCE TEST IN PROGRESS	Test Complete	BIT status updated	STANDBY
Any State	SET_STATE - Reset	Boot Exec and Application Execute Confidence Test	CONFIDENCE TEST IN PROGRESS
Any State except EXTENDED BIT	SET_STATE - Standby	Clear Config, Ephem, or Both	STANDBY
Any State except EXTENDED BIT	SET_STATE - Start Extended BIT	Run extended BIT	EXTENDED BIT (Goto STANDBY when complete)
EXTENDED BIT	SET_STATE - Halt Extended BIT	Stop extended BIT Place results in status	STANDBY
STANDBY	PTE_GENERAL_CONFIG, DEMOD_SPECIFIC_ CONFIG and DEMOD_ COMMON_CONFIG	Start Configuration	DEMOD CONFIGURED (via config in prog)
DEMOD CONFIGU - RATION IN PROGRESS (From Standby)	Configuration Complete	None	DEMOD CONFIGURED
DEMOD CONFIGURED	START_ACQUISITION	Start Acquisition	ACQUISITION
	DEMOD_SPECIFIC_ CONFIG	Configure	DEMOD CONFIGURED (via config in prog)
	DEMOD_COMMON_ CONFIG	Configure PN Model	DEMOD CONFIGURED (via config in prog)
	START PN MODEL	Start PN Model	DEMOD CONFIGURED
ACQUISITION	DEMOD_SPEC_CONFIG	Stop Acq., Reconfigure	DEMOD CONFIGURED (via config in prog)
	DEMOD_COMMON_ CONFIG	Stop Acq., Reconfigure	DEMOD CONFIGURED (via config in prog)

TABLE H5 - 3a. PTE DEMOD STATE TRANSITION TABLE (CONT)
(NON - COHERENT TURNAROUND PTE MODE)

Current State	Event	Action	Next State
ACQUISITION (cont)	PN / Carrier Lock	Start Tracking	TRACK
TRACK	DEMOD_SPEC_CONFIG	Stop Track Reconfigure	DEMOD_CONFIGURED (via config in prog)
	DEMOD_COMMON_CONFIG	Stop Tracking, Reconfigure	DEMOD_CONFIGURED (via config in prog)
	RANGE_CHANNEL_ REACQUISITION	Stop Track of Command Channel, Initiate Track of Range Channel	TRACK

TABLE H5 - 3b. (NOT USED)

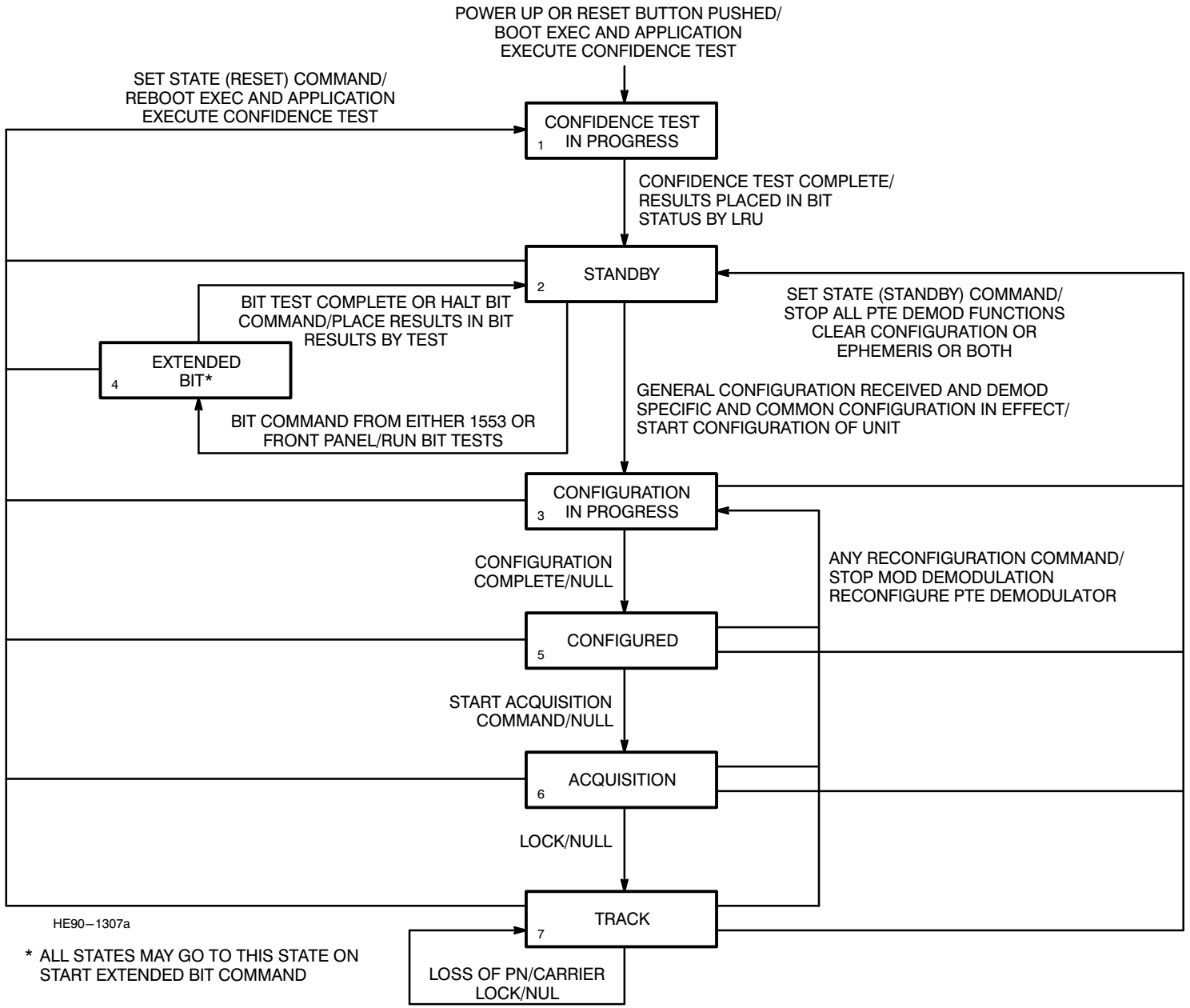

Figure H5−2. PTE Demod Non−coherent Turnaround State Transition Diagram

TABLE H5 - 3c. PTE MOD STATE TRANSITION TABLE (NON - COHERENT TURNAROUND PTE MODE)

Current State	Event	Action	Next State
POWER OFF	Power - On	Boot Exec and Application Execute Confidence Test	CONFIDENCE TEST IN PROGRESS
CONFIDENCE TEST IN PROGRESS	Test Complete	BIT status updated	STANDBY
Any State	SET_STATE - Reset	Boot Exec and Application Execute Confidence Test	CONFIDENCE TEST IN PROGRESS
Any State Except Extended BIT	SET_STATE - Standby	Clear Config, Ephem, or Both	STANDBY
	SET_STATE - Run Extended BIT	Run extended BIT	EXTENDED BIT (Goto STANDBY when complete)
EXTENDED BIT	SET_STATE - Halt Extended BIT	Stop extended BIT Place results in status	STANDBY
STANDBY	PTE_GENERAL_CONFIG and MOD_CONFIG	Start Configuration	MOD CONFIGURED (via config in prog)
MOD CONFIGURATION IN PROGRESS (From Standby)	Configuration Complete	None	MOD CONFIGURED
MOD CONFIGURED	START_SERVICE	Initialize PN epoch counter	MOD IN SERVICE
	MOD_CONFIG	Configure	MOD CONFIGURED (via config in prog)
MOD IN SERVICE	MOD_CONFIG	Configure	MOD CONFIGURED (via config in prog)
	START_SERVICE	Resynchronize PH Epoch	MOD IN SERVICE

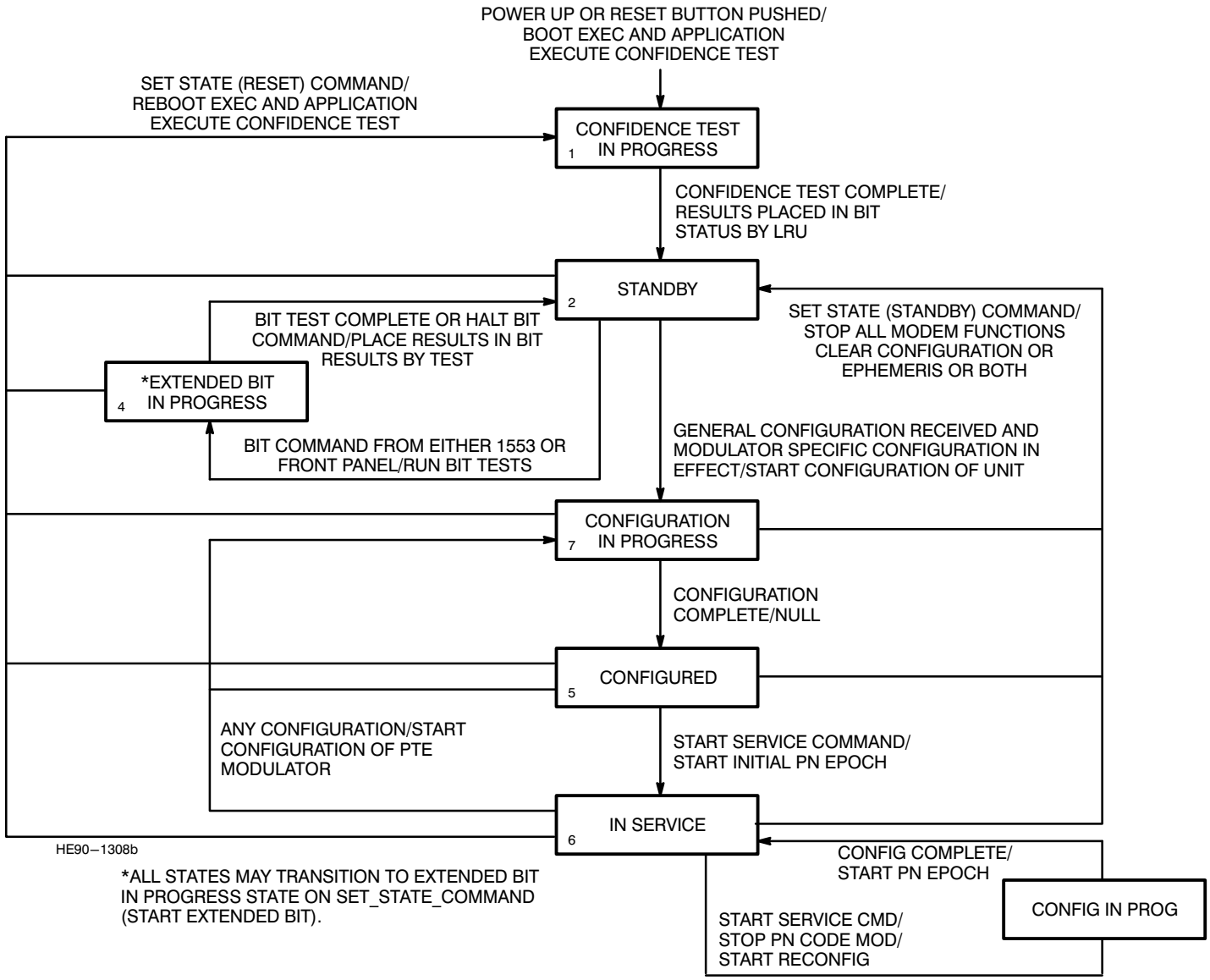

Figure H5–3. PTE Modulator Non–Coherent Turnaround State Transition Diagram

TABLE H5 - 3d. PTE MODEM STATE TRANSITION TABLE (COHERENT TURNAROUND PTE MODE)

Current State	Event	Action	Next State
POWER OFF	Power - On	Boot Exec and Application Execute Confidence Test	CONFIDENCE TEST IN PROGRESS
CONFIDENCE TEST IN PROGRESS	Test Complete	BIT status updated	STANDBY
Any State	SET_STATE - Reset	Boot Exec and Application Execute Confidence Test	CONFIDENCE TEST IN PROGRESS
Any State Except EXTENDED BIT	SET_STATE - Standby	Clear Config, Ephem, or Both	STANDBY
	SET_STATE - Run Extended BIT	Run extended BIT	EXTENDED BIT (Goto STANDBY when complete)
EXTENDED BIT	SET_STATE - Halt Extended BIT	Stop extended BIT Place results in status	STANDBY
STANDBY	PTE_GENERAL_ CONFIG, DEMOD_ SPECIFIC_CONFIG, and DEMOD_ COMMON_CONFIG	Start Configuration	CONFIGURED (via config in prog)
CONFIGURATION IN PROGRESS (From Standby)	Configuration Complete	None	CONFIGURED
CONFIGURED	START_ACQUISITION	Start Acquisition	ACQUISITION
	SPECIFIC_CONFIG	Configure	CONFIGURED
	COMMON_CONFIG	Reconfigure	CONFIGURED (via config in prog)
	START PN Model	Start PN Model	CONFIGURED
ACQUISITION	SPEC_CONFIG	Stop Mod & Demod Func Reconfigure	CONFIGURED (via config in prog)
	COMMON_CONFIG	Stop Mod & Demod Func Reconfigure	CONFIGURED (via config in prog)

TABLE H5 - 3d. PTE MODEM STATE TRANSITION TABLE (CONT)
(COHERENT TURNAROUND PTE MODE)

Current State	Event	Action	Next State
ACQUISITION (cont)	PN / Carrier Lock	Start tracking Initiate PN Modulation	TRACK & IN SERVICE
TRACK	SPECIFIC_CONFIG	Stop Mod & Demod Func Start Reconfiguration	CONFIGURED (via config in prog)
	COMMON_CONFIG	Stop Mod & Demod Func	CONFIGURED (via config in prog)
	RANGE_CHANNEL REACQUISITION	Stop Track of Command Channel, Initiate Track of Range Channel	TRACK

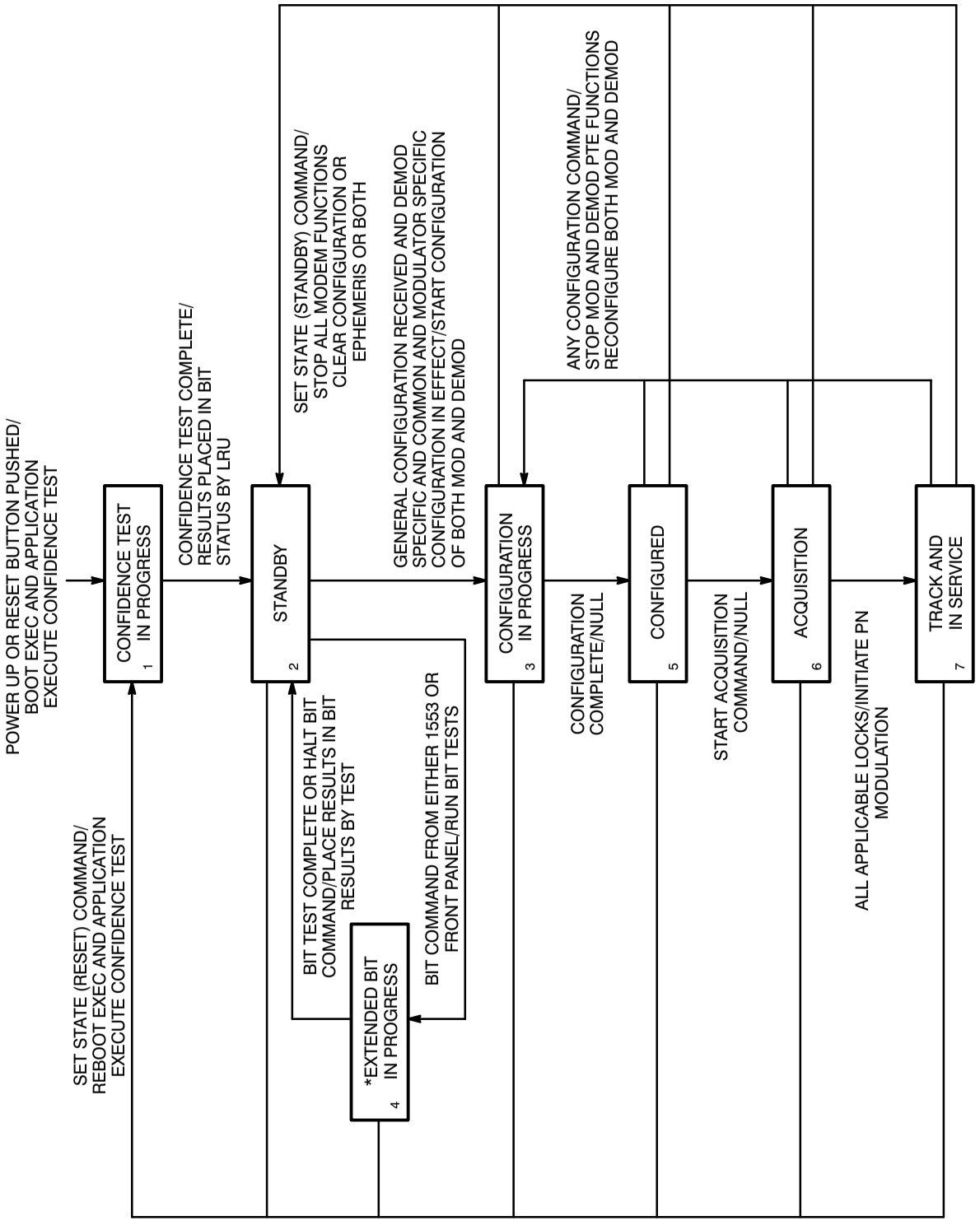

Figure H5−4. PTE Modem Coherent Turnaround Mode State Transition Diagram

H5.2.5 DEMOD PN MODEL SETUP REQUIREMENTS

a) The COMMON CONFIGURATION COMMAND shall be effective at least 1 second prior to the effective time of the START PN MODEL COMMAND.

This is necessary in order for the PTE to process the setup data from the COMMON CONFIGURATION COMMAND and the Demod_Specific_Configuration_CMD so that the PN model can be started.

b) No ephemeris data shall be required to start forward model.

c) The PN model may be started only in the configured state. The PN model must be started (via the START PN MODEL COMMAND) prior to receipt of the START ACQUISITION COMMAND, so that the PTE can use the PN code state for acquisition.

d) Receipt of a new START PN MODEL COMMAND shall cause the PN model to restart and synchronize with the specified 1pps.

H5.2.6 RECONFIGURATIONS

A reconfiguration will cause the PTE (modulator and/or demodulator receiver depending on PTE mode) to return to the Configured State. A new start command (START ACQUISITION or START SERVICE) is required to begin processing following a reconfiguration.

H5.2.7 COMMAND PROCESSING REQUIREMENTS

In addition to the requirements in this ICD, further processing requirements are defined in the performance requirements in the applicable HWCI's.

H5.2.8 COMMAND MEMORY

The PTE shall provide a memory capability for the SPECIFIC and COMMON configuration commands. This will allow a null command (no bits set in the BIT MAP) to be sent to transition from one state to the next, provided the applicable data were supplied during a previous command transmission. The PTE shall use the data from this last transmission to perform any necessary configurations.

H5.3 PTE STATUS REPORTING AND TIME - TAGGING

Status shall be collected and reported once per second and time tagged to a 1 pps mark. Status reports time tagged "t_0" shall contain:

Integrated Status - Integrated status over the time period (t_0 - 1) to t_0. This includes lock status and doppler frequency status.

Snapshot Status - Status sampled at the 1pps reflecting equipment state or a measurement at the instant t_0. This shall include status that reflects a synchronous command with an effective time of t_0, as well as status that reflects an asynchronous which took effect within the previous second.

Status reports time tagged "t_o" shall be available for collection by the subsystem controller throughout the interval

(t_0 + 400ms) to (t_0 + 1 second),

as illustrated in Figure H5 - 9.

Extended BIT Status shall be available from 400 ms of the 1 pps interval immediately following completion of the BIT, until start of the next Extended BIT.

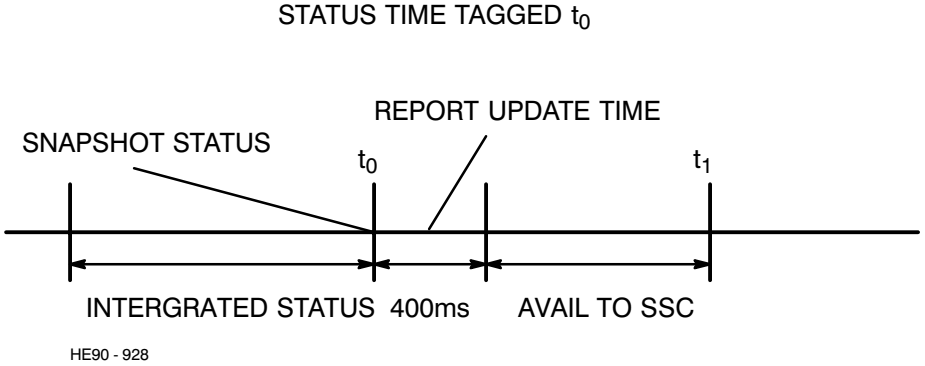

Figure H5 - 5. Status Reporting

H5.4 EPHEMERIS DOWNLOADING

a) The term "Ephemeris" shall be used to refer to frequency and delay profiles provided to the PTE, for the purpose of this ICD.

b) The Download Command shall always precede the Ephemeris Data Command. The time spacing between these commands shall be limited only by the 1553b rate.

c) Ephemeris downloading shall follow a "2 - 10 - 2" rule.

2 - 10 - 2 Rule:
Ephemeris data shall be required **two seconds in advance** of its use and received at a rate **not to exceed ten minutes** of ephemeris data **in any two second period**.

The ADPE shall ensure sufficient timing margins to compensate for any timing uncertainties, so that the above requirements are met.

Ephemeris processing requires up to ten seconds starting from the completion of an ephemeris data download. If processing takes longer, the unit shall use the first point that it can as a safeguard. The unit will use the data from the previous download until it is ready to switch to the data in the new download. The unit shall use the first point in the new download that it can. If no ephemeris data has been downloaded, the unit shall assume zero doppler and zero range.

d) Commands may be received during ephemeris data download.

e) Ephemeris data shall be rejected if the time of FIRST DATA POINT is greater than 60 minutes into the future.

f) If, at any time, the PTE runs out of valid ephemeris data, it shall continue using the most recent (by time tag, not receipt time) valid ephemeris data points it has, until new ephemeris data are provided.

H5.5 SUBSYSTEM CONTROLLER STATUS COLLECTION

Upon receipt of the 1PPS epoch command from the ADPE, the SSC shall initiate a delay of 400 ms prior to collecting the PTE status when PTE tables have been selected by the ADPE. The SSC shall collect status within a 450 ms window following the delay, which will be reported to ADPE upon receipt of the next transmit status command. Figure H5 - 6 shows a timeline of the status collection process.

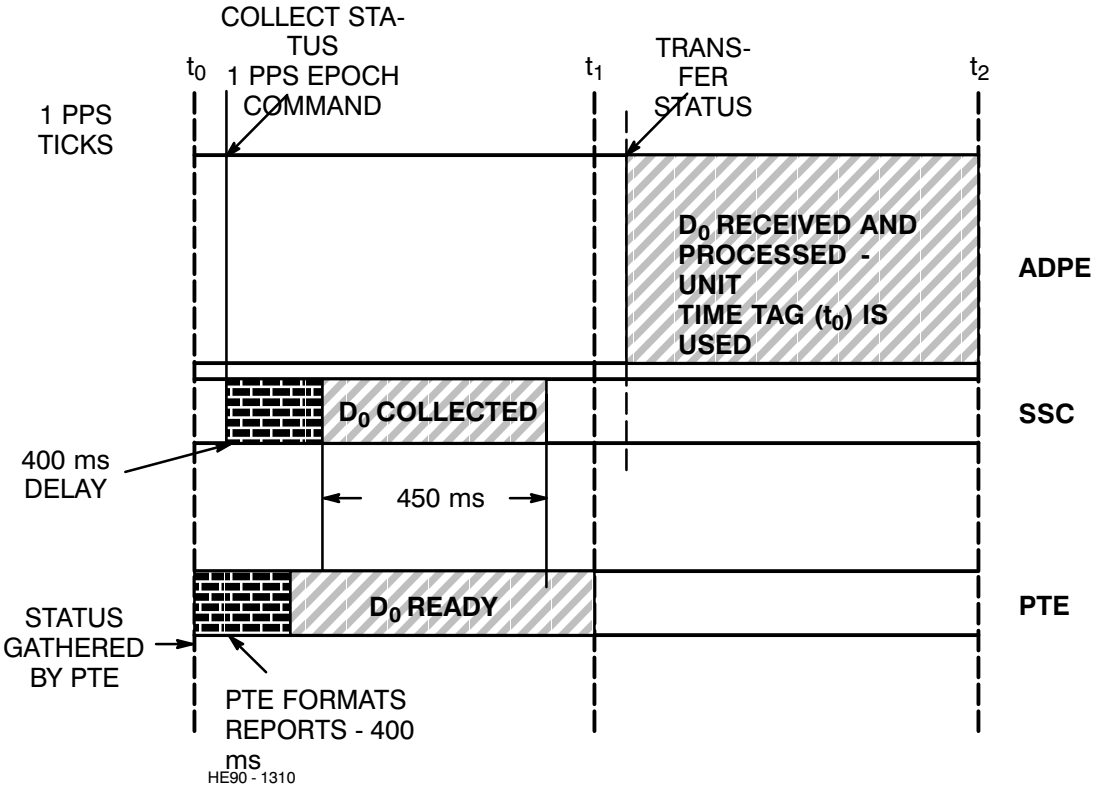

Figure H5 - 6. SSC - PTE Status Collection Window

SECTION H6
FORMAT CONTROL LEVEL

H6.1 GENERAL

This section describes the Format Control Level interactions of the PTE - SSC/ADPE interface (interaction 2 of Figure H4 - 1).

H6.2 MESSAGE FORMATS

H6.2.1 FORMAT STRUCTURE

All message formats between the PTE and the SSC /ADPE shall contain a Start Checkword and an End Checkword as shown in each message. In addition, all message lengths shall contain an even number of bytes, less than or equal to 64, so that the message format may conform to a 1553 data transfer as one data block. The exception is ephemeris data which may be sent in as many blocks and bytes as is necessary up to 9606 words. In addition, note that all data parameters which are either 2 bytes or 4 bytes in length must start on a full 1553 word (odd byte) boundary.

H6.2.2 COMMAND FIELD DEFINITIONS

The command format is defined by the contents of the command fields shown below.

BYTE #	BIT # S	TYPE	RANGE	UNITS	RESOLUTION	DESCRIPTION

These fields are defined as follows:

BYTE # specifies the byte number(s) of the associated command parameter, relative to its position in the command. Where a parameter is defined over several bytes, the leftmost, lowest numbered byte contains the MSB (most significant bit).

BIT #S specifies the bit numbers within the byte(s) of the associated parameter. Bit 0 is always the LSB.

TYPE specifies the data representation.
Three data types are used in this ICD. These consist of:
BIN - Binary indicates that the data specified in the field will be in a binary format, with the LSB specified in the resolution field. All negative numbers shall be represented in binary 2's complement format. The range field for binary is specified in decimal.

HEX - HEX is used to specify that the range field has been specified in HEX. This has been used to specify the Start and End Checkwords.

OCT - Octal is used for PN codes to indicate that the range as well as the data is to be read and transferred in an octal format, where each digit is represented by three bits.

RANGE specifies the range of allowable values that a parameter may take on. The range for BINARY types are specified in decimal, HEX is in hex, and OCT is in octal. The range is described in terms of the units, unless otherwise specified.

UNITS define the units of measurement of this parameter.

RESOLUTION specifies the value of the LSB for the associated parameter. Unless otherwise specified, the resolution is in terms of the units.

DESCRIPTION provides the name of the parameter (in bold face capital letters), any subparameters (in non - bold face capital letters), and a description of that parameter.

H6.2.3 STATUS FIELD DEFINITIONS

The status fields are identical to the command fields, except that an additional field, ACCURACY, is provided.

ACCURACY specifies the accuracy of a measurement, with respect to its resolution. Accuracy does not impose requirements on the PTE but reflects actual design.

H6.2.4 RESERVED FIELDS

Fields marked “Reserved” are for IEC use or to preserve commonality of “inter - unit commands” only and should be set to zero. These fields shall not be considered spares. Fields labeled as “Spare” are available for future use.

H6.3 PTE COMMANDS

SUMMARY OF PTE COMMANDS:

PTE GENERAL COMMANDS

PTE_SET_STATE_CMD
PTE_GENERAL_CONFIGURATION_CMD
PTE_DOWNLOAD_CMD
PTE_EPHEMERIS_DATA_CMD

PTE MODULATOR COMMANDS

PTE_MOD_CONFIGURATION_CMD
PTE_MOD_START_SERVICE_CMD
PTE_MOD_START_RTN_BER_TEST_CMD
PTE_MOD_MEASURE_TIME_INTERVAL_CMD

PTE DEMODULATOR COMMANDS

PTE_DEMOD_SPECIFIC_CONFIGURATION_CMD
PTE_DEMOD_COMMON_CONFIGURATION_CMD
PTE_DEMOD_START_ACQUISITION_CMD
PTE_DEMOD_START_PN_MODEL_CMD
PTE_DEMOD_START_FWD_BER_TEST_CMD
PTE_DEMOD_RANGE_CHANNEL_REACQUISITION

PTE_SET_STATE_CMD

Description:

Type: Asynchronous

Used to reset unit, put unit into standby, run extended BIT, and halt extended BIT. When put into standby, this command can be setup to clear ephemeris, configuration, or both.

Command Verification: None

Format:

BYTE #	BIT # S	TYPE	RANGE	UNITS	RESOLUTION	DESCRIPTION
1,2	15 - 0	HEX	AA55	N/A	N/A	**START CHECKWORD**
3	7 - 0	BIN	N/A	N/A	N/A	**SPARE**
4	7 - 0	BIN	1 TO 4	N/A	N/A	**INITIALIZATION TYPE:** 1 = RESET PTE will perform reboot and confidence test 2 = STANDBY Puts PTE in standby state. Acquisition lost. 3 = RUN EXTENDED BIT Runs a sequence of BIT tests whose results will be made available via the Extended BIT report. 4 = HALT EXTENDED BIT Halts upon completion of current test. To do an immediate halt, use RESET.

PTE_SET_STATE_CMD (CONT)

BYTE #	BIT # S	TYPE	RANGE	UNITS	RESOLUTION	DESCRIPTION
5,6	15 - 0	BIN	0 TO 3	N/A	N/A	**INITIALIZATION DATA:** Compliments initialization type as follows: 0 = N/A (Use when data initialization type is not standby. 1 = STANDBY CLEAR EPHEMERIS Clears out any ephemeris data previously sent and initializes ephemeris related data for receipt of new data. 2 = STANDBY CLEAR CONFIGURATION Clears out any configuration data previously sent and initializes configuration related data for receipt of new config. data 3= STANDBY CLEAR CONFIG and EPHEMERIS Executes both the Clear Ephemeris and Clear Configuration above
7,8	15 - 0	HEX	55AA	N/A	N/A	**END CHECKWORD**

PTE_GENERAL_CONFIGURATION_CMD

Description:

Type: Asynchronous

This command specifies whether the modulator frequency source is derived locally or from demod. Demod is specified for End - to - End test coherent turnaround.

Command Verification:
GENERAL STATUS REPORT

Each parameter in the command shall be reflected under a similar name in the GENERAL STATUS REPORT.

Format:

BYTE #	BIT # S	TYPE	RANGE	UNITS	RESOLUTION	DESCRIPTION
1,2	15 - 0	HEX	AA55	N/A	N/A	**START CHECKWORD**
3	7 - 0	BIN	0 - 1	N/A	N/A	**MODULATOR FREQUENCY SOURCE** 0 = LOCAL 1 = COHERENTLY DERIVED FROM DEMOD
4	N/A	N/A	N/A	N/A	N/A	SPARE
5,6	15 - 0	HEX	55AA	N/A	N/A	**END CHECKWORD**

PTE_DOWNLOAD_CMD

Description:

Type: Asynchronous

Used to notify the PTE that an ephemeris block (or firmware - not used by ADPE) download is following. This command must be sent prior to sending an ephemeris data block.

Command Verification:

PERFORMANCE REPORT

Observe EPHEMERIS STATUS for UPDATE COMPLETE after the ephemeris data has been downloaded. The unit has up to ten seconds from receipt of the last data point to complete the processing. This command shall cause the UPDATE COMPLETE parameter to be reset. It shall set upon processing completion.

Format:

BYTE #	BIT # S	TYPE	RANGE	UNITS	RESOLUTION	DESCRIPTION
1,2	15 - 0	HEX	AA55	N/A	N/A	**START CHECKWORD**
3	7 - 0	BIN	N/A	N/A	N/A	**SPARE**
4	7 - 0	BIN	1 TO 2	N/A	N/A	**DOWNLOAD TYPE:** 1 = DOWNLOAD EPHEMERIS 2 = DOWNLOAD FIRMWARE (RESERVED FOR IEC USE.)
5 - 8	31 - 0	BIN	0 - 9606	16 BIT WORDS	1 WORD	**1553 WORD COUNT** If Download type field contains 1 then this field specifies # of 1553 words of Ephemeris. If 2, this field specifies # of words of MCP Firmware
9,10	15 - 0	BIN	0	N/A	N/A	**RESERVED FOR IEC USE**
11,12	15 - 0	HEX	55AA	N/A	N/A	**END CHECKWORD**

PTE_EPHEMERIS_DATA_CMD

Description:

Provides frequency and delay profiles for the PTE.

The TABLE SELECT BIT MAP is used to specify the tables that are to be sent. Tables, if sent, shall be in the order specified by the format. This is a variable length table. If a table is not sent, there shall be no unused bytes inserted in its place. All tables within a download shall have the same length (same # of points). Each data point represents the ephemeris at half second increments. The time represents the time of the first data point.

The PTE modulator frequency compensation profile, $df_{RM}(t)$, is a table of delta frequency values to be applied to the modulator's if carrier frequency when the PTE is in it's non - coherent - turnaround mode.

The PTE demod forward model doppler compensation profile, $df_{DC}(t)$, is a table of delta frequencies which correspond to the doppler compensation profile supplied to the associated MDP during loopback test.

The PTE demod delay profile, $\hat{D}(t)$, is a table of estimated round trip delay values from the associated MDP to the PTE.

Command Verification:

PERFORMANCE REPORT

Observe EPHEMERIS STATUS for UPDATE COMPLETE after the ephemeris data has been downloaded. The unit has up to ten seconds from receipt of the last data point to complete the processing.

Format:

PTE_EPHEMERIS_DATA_CMD (CONT)

BYTE #	BIT # S	TYPE	RANGE	UNITS	RESOLUTION	DESCRIPTION
1,2	15 - 0	HEX	AA55	N/A	N/A	**START CHECKWORD**
3	7 - 0	BIN	0 - 23	HOURS	LSB = 1	**TIME OF FIRST POINT - HOURS**
4	7 - 0	BIN	0 - 59	MINUTES	LSB = 1	**TIME OF FIRST POINT - MINUTES**
5	7 - 0	BIN	0 - 59	SECONDS	LSB = 1	**TIME OF FIRST POINT - SECONDS**
6	7 - 0	BIN				**SPARE**
7,8	15 - 0	BIN	0 - 1200	# POINTS	1	**NUMBER OF POINTS PER TABLE (N)**
9,10	15 - 0	BIN	N/A	N/A	N/A	**TABLE SELECT BIT MAP**
	0	BIN	0 OR 1	N/A	N/A	1 = PTE MODULATOR FREQ COMP TABLE
	1	BIN	0 OR 1	N/A	N/A	1 = PTE DEMOD FORWARD MODEL DOPPLER COMPENSATION TABLE
	2					1 = PTE DEMOD DELAY TABLE
	3	BIN	0 OR 1	N/A	N/A	RESERVED
	4 - 15	BIN	0 OR 1	N/A	N/A	SPARES
X,X,X,X	31 - 0	BIN	- 2 MHz to + 2 MHz	cHz (0.01 Hz)	LSB = 1 cHz	**PTE MODULATOR FREQUENCY COMPENSATION TABLE - POINT 1** THRU
	same	same	same	same	same	**POINT N**
	31 - 0	BIN	- 650 kHz to +700 kHz	cHz (0.01 Hz)	LSB = 1 cHz	**PTE DEMOD FORWARD MODEL DOPPLER COMPENSATION TABLE - POINT 1** THRU
	same	same	same	same	same	**POINT N**
	31 - 0	BIN	0 to 10^9	nsec	1	**PTE DEMOD DELAY TABLE - POINT 1** THRU
	same	same	same	same	same	**POINT N**
	31 - 0					**RESERVED (TDRS DOPPLER TABLE - POINT 1** THRU **TDRS DOPPLER TABLE - POINT N)**
Y,Y	15 - 0	HEX	55AA	N/A	N/A	**END CHECKWORD**

*** N is the number of points per table**

PTE_MOD_CONFIGURATION_CMD

Description:

Type: Asynchronous

This command is used for initial configuration or reconfiguration of the PTE. Unlike the IR, MDP, and PTE DEMOD, the PTE MODULATOR has only one configuration command. There is no synchronous configuration command. The PTE MODULATOR reads only the parameters demarcated in the configuration bit map. All others are ignored.

The PTE MODULATOR will configure or reconfigure parameters specified in the configuration bit map according to the new data indicated.

This command cannot be executed unless the PTE_GENERAL_CONFIGURATION_COMMAND data has been downloaded. If the GENERAL data has not been provided, the PTE will wait for this data and execute when received.

Command Verification:

PTE_MOD_CONFIGURATION_REPORT

Each Parameter in the configuration command is reflected under a similar name in the configuration report.

Format:

PTE_MOD_CONFIGURATION_CMD (CONT)

BYTE #	BIT # S	TYPE	RANGE	UNITS	RESOLUTION	DESCRIPTION
1,2	15 - 0	HEX	AA55	N/A	N/A	**START CHECKWORD**
3,4	15 - 0	BIN	N/A	N/A	N/A	**SPARE**
5 - 8	31 - 0	BIN		N/A	N/A	**CONFIGURATION ITEM BIT MAP** This field identifies whether or not a particular configuration data item is valid. Only items with their corresponding bit set to "1" in the bit map will be updated.
	0 - 1					SPARES
	2		0 OR 1			MODULATION INDEX
	3		0 OR 1			SUBCARRIER FREQUENCY
	4					SPARE
	5		0 OR 1			NOMINAL IF OUTPUT FREQUENCY
	6		0 OR 1			KSAR OUTPUT CONFIGURTION
	7		0 OR 1			SERVICE MODE
	8		0 OR 1			SERVICE TYPE
	9		0 OR 1			SETUP MISCELLANEOUS PARAMETERS SSA interleaving, G2 inversion setup.
	10		0 OR 1			I/Q POWER RATIO
	11		0 OR 1			I DATA FORMAT
	12		0 OR 1			Q DATA FORMAT
	13		0 OR 1			I ENCODING
	14		0 OR 1			Q ENCODING
	15		0 OR 1			I SYMBOL FORMAT
	16		0 OR 1			Q SYMBOL FORMAT
	17		0 OR 1			JITTER TEST CLOCK INPUT CONTROL
	18		0 OR 1			I DATA RATE
	19		0 OR 1			Q DATA RATE
	20		0 OR 1			SINGLE/DUAL CHANNEL MODULATION
	21		0 OR 1			RTN LINK MODE 1&3 FEEDBACK TAPS
	22		0 OR 1			INITIAL A REGISTER VALUE
	23		0 OR 1			INITIAL C REGISTER VALUE
	24		0 OR 1			I DATA SOURCE
	25		0 OR 1			Q DATA SOURCE
	26		0 OR 1			NOISE ON/OFF
	27		0 OR 1			C/No SETTING
	28		0 OR 1			I BERT PN LENGTH
	29		0 OR 1			Q BERT PN LENGTH
	30		0 OR 1			RETURN MODULATOR IF OFFSET FREQUENCY
	31		0 OR 1			RETURN LOOP TEST TRANSLATION FREQUENCY

PTE_MOD_CONFIGURATION_CMD (CONT)

BYTE #	BIT # S	TYPE	RANGE	UNITS	RESOLUTION	DESCRIPTION
9	7 - 0	BIN	1 TO 29	N/A	N/A	**SERVICE TYPE**

1 = KSAR, DG - 1, COHERENT
2 = KSAR, DG - 1, NONCOHERENT
3 = SPARE
4 = KSAR, DG - 2, MODE 1
5 = KSAR, DG - 2, MODE 2
6 = KSHR, MODE 1
7 = KSHR, MODE 2
8 = SSAR, DG - 1, COHERENT
9 = SSAR, DG - 1, NONCOHERENT
10 = SPARE
11 = SSAR, DG - 2, MODE 1
12 = SSAR, DG - 2, MODE 2
13 = SSHR, MODE 1 OR 2
14 = RESERVED
15 = SPARE
16 = SPARE
17 = SSHR, COHERENT
18 = MAR, DG - 1, MODE 1
19 = MAR, DG - 1, MODE 2
20 = RESERVED(KSAF)
21 = RESERVED(KSHF)
22 = RESERVED(SSAF)
23 = RESERVED(SSHF)
24 = SPARE
25 = RESERVED(MAF)
26 = RESERVED
27 = RESERVED
28 = RESERVIED
29 = RESERVED

PTE_MOD_CONFIGURATION_CMD (CONT)

BYTE #	BIT # S	TYPE	RANGE	UNITS	RESOLUTION	DESCRIPTION
10	7 - 0	BIN				**SETUP MISCELLANEOUS PARAMETERS**
	0					RESERVED
	1		0 OR 1	N/A	N/A	SSA INTERLEAVING I: 1 = ON 0 = OFF
	2		0 OR 1	N/A	N/A	SSA INTERLEAVING Q: 1 = ON 0 = OFF
	3					SPARE
	4		0 OR 1	N/A	N/A	I ENCODING G2 INVERSION 1 = INVERTED 0 = NOT INVERTED
	5		0 OR 1	N/A	N/A	Q ENCODING G2 INVERSION 1 = INVERTED 0 = NOT INVERTED
	6 - 7					SPARE
11	7 - 0					SPARE
12	7 - 0	BIN	6 (4:1) 0 (1:1) - 3 (1:2) - 6 (1:4)	dB	LSB = 0.1	**I/Q POWER RATIO, SINGLE/DUAL CHANNEL MODULATION = 1 - 6** - OR -
			0.2 TO 1.5, OR 0	radians	LSB = 0.1	**MODULATION INDEX, SINGLE/DUAL CHANNEL MODULATION = 7 - 9**
13	7 - 0	BIN	1 TO 6	N/A	N/A	**I DATA FORMAT** Specifies how to format the NRZ I channel input data. 1 = NRZ - L 2 = NRZ - M 3 = NRZ - S 4 = BIPhase - L 5 = BIPhase - M 6 = BIPhase - S

PTE_MOD_CONFIGURATION_CMD (CONT)

BYTE #	BIT # S	TYPE	RANGE	UNITS	RESOLUTION	DESCRIPTION
14	7 - 0	BIN INT	1 TO 6	N/A	N/A	**Q DATA FORMAT** Specifies how to format the NRZ Q channel input data. 1 = NRZ - L 2 = NRZ - M 3 = NRZ - S 4 = BIPhase - L 5 = BIPhase - M 6 = BIPhase - S
15	7 - 0	BIN INT	1 TO 4	N/A	N/A	**I ENCODING** 1 = UNCODED 2 = CODE 1 (R=1/2) 3 = CODE 2 (R=1/2) 4 = CODE 3 (R=1/3) 5 = CODE 4 (R=1/3, SHUTTLE)
16	7 - 0	BIN INT	1 TO 4	N/A	N/A	**Q ENCODING** 1 = UNCODED 2 = CODE 1 (R=1/2) 3 = CODE 2 (R=1/2) 4 = CODE 3 (R=1/3) 5 = CODE 4 (R=1/3, SHUTTLE)
17	7 - 0	BIN INT	1 TO 2	N/A	N/A	**I SYMBOL FORMAT** 1 = NRZ 2 = BIPHASE
18	7 - 0	BIN INT	1 TO 2	N/A	N/A	**Q SYMBOL FORMAT** 1 = NRZ 2 = BIPHASE
19						**JITTER TEST CLOCK INPUT CONTROL** Controls whether TM Return Modulator internally generates its symbol clock (Disabled) or uses an externally provided clock (Enabled). Normal operations always require the “Disabled” setting; “Enabled” is for special testing only. When “Enabled” setting is used, the externally supplied clock should be at 2x the channel baud rate, and must be present before the configuration command is received. Only one of the two jitter clock inputs, either I or Q, can be enabled at a time.
	0	BIN	0 OR 1	N/A	N/A	I - CHANNEL JITTER CLOCK INPUT 0 = DISABLED 1 = ENABLED
	1	BIN	0 OR 1	N/A	N/A	Q - CHANNEL JITTER CLOCK INPUT 0 = DISABLED 1 = ENABLED
	2 - 7					SPARE

PTE_MOD_CONFIGURATION_CMD (CONT)

BYTE #	BIT # S	TYPE	RANGE	UNITS	RESOLUTION	DESCRIPTION
20	7 - 0	BIN	1 TO 9	N/A	N/A	**SINGLE / DUAL CH. MODULATION** 1 = I CHANNEL BPSK 2 = Q CHANNEL BPSK 3 = SINGLE CHANNEL DG - 1 QPSK 4 = SINGLE CHANNEL SQPSK ALT DATA BITS 5 = SINGLE CHANNEL SQPSK ALT CODED SYMBOLS 6 = DUAL CHANNEL QPSK 7 = SINGLE CHANNEL PM 8 = SINGLE CARRIER SINEWAVE SUBCARRIER 9 = SINGLE CHANNEL SQUAREWAVE SUBCARRIER
21 - 24	31 - 0	BIN	100 bps TO 12 M bps	BPS	LSB = 1	**I DATA RATE** 12 Mbps supported only for SINGLE/DUAL CH. MOD = 4
25 - 28	31 - 0	BIN	100 TO 150,000,000	BPS	LSB = 1	**Q DATA RATE, SINGLE/DUAL CHANNEL MODULATION 1 - 6**
						- OR -
			25,000 TO 3,000,000	Hz	LSB = 1	**SUBCARRIER FREQUENCY, SINGLE/ DUAL CHANNEL MODULATION = 8 - 9**
29 - 32	31 - 0					**RETURN LINK MODE 1 and 3 FEEDBACK TAPS**
	20 - 0	OCT	1000000 TO 1777777	N/A	N/A	Tap Values
	31 - 21	BIN	0			**ZERO PADS**
33,34	15 - 0					**INITIAL A REGISTER VALUE**
	11 - 0	OCT	0001 TO 3777	N/A	N/A	11 bit initial value
	15 - 12	BIN	0			**ZERO PAD**
35,36	15 - 0					**INITIAL C REGISTER VALUE**
	11 - 0	OCT	0001 TO 3777	N/A	N/A	11 bit initial value
	15 - 12	BIN	0			**ZERO PAD**
37	7 - 0	BIN	0 TO 1	N/A	N/A	**I DATA SOURCE** 0 = INTERNAL (FROM BERTS) 1 = EXTERNAL (FROM DIS)

PTE_MOD_CONFIGURATION_CMD (CONT)

BYTE #	BIT # S	TYPE	RANGE	UNITS	RESOLUTION	DESCRIPTION
38	7 - 0	BIN	0 TO 1	N/A	N/A	**Q DATA SOURCE** 0 = INTERNAL (FROM BERTS) 1 = EXTERNAL (DIS)
39	7 - 0	BIN	0 TO 1	N/A	N/A	**NOISE ON / OFF** 0 = OFF 1 = ON
40	7 - 0					**SPARE**
41 - 42	15 - 0	BIN	27 - 88	dB - Hz	1	**C/No SETTING**
43	7 - 0	BIN	5,9,11, 20,23	N/A	N/A	**I BERT PN LENGTH** Default = 11
44	7 - 0	BIN	5,9,11, 20,23	N/A	N/A	**Q BERT PN LENGTH** Default = 11
45	7 - 0	BIN	1 TO 2	N/A	N/A	**NOMINAL IF OUTPUT FREQ (To which the Doppler Profile will be applied)** 1 = 8.5 MHZ 2 = 370 MHZ
46	7 - 0	BIN	1 TO 3	N/A	N/A	**OUTPUT CONFIGURATION** 1 = MODULATED 370 MHz CARRIER 2 = UNMODULATED 370 MHz PLUS BASEBAND I - CHANNEL (KSAR DG1 MODE 3 SPLIT MODE) 3 = Spare *Note: Noise will only be applied when output is configured as modulated*
47	7 - 0	BIN	1 TO 3	N/A	N/A	**SERVICE MODE** Provides further definition for Service Types 1, 8, and 13. 1 = Mode 1 2 = Mode 2 3 = Mode 3
48	7 - 0					**SPARE**
49 - 52	31 - 0	BIN	+1600 MHz to +15000 MHz	kHz	LSB = 1 kHz	**RETURN LOOP TEST TRANSLATION FREQUENCY, f_{trl}**
53 - 56	31 - 0	BIN	- 2 MHZ to + 2 MHZ	HZ	LSB = 1 Hz	**RETURN MODULATOR IF OFFSET FREQUENCY, df_M**
57 - 58	15 - 0	HEX	55AA	N/A	N/A	**END CHECKWORD**

PTE_MOD_START_SERVICE

Description:

Type: Synchronous

This command specifies the time to start PN modulation for the PTE Non - Coherent Mode, with the PN epoch starting on the specified 1 pps.

Command Verification:

PTE_MOD_PERFORMANCE_REPORT

Check the OPERATING STATE for IN SERVICE.

Format:

BYTE #	BIT # S	TYPE	RANGE	UNITS	RESOLUTION	DESCRIPTION
1 - 2	15 - 0	HEX	AA55	N/A	N/A	**START CHECKWORD**
3	7 - 0	BIN	0 - 23	HOURS	LSB = 1	**EFFECTIVE TIME HOURS**
4	7 - 0	BIN	0 - 59	MINUTES	LSB = 1	**EFFECTIVE TIME MINUTES**
5	7 - 0	BIN	0 - 59	SECONDS	LSB = 1	**EFFECTIVE TIME SECONDS**
6	7 - 0	BIN	N/A	N/A	N/A	**SPARE**
7 - 8	15 - 0	HEX	AA55	N/A	N/A	**END CHECKWORD**

PTE_MOD_START_RTN_BER_TEST_CMD

Description:

Type: Asynchronous

Sets up and initiates Bit Error Rate (BER) testing of the Return I and/or Q channels via the Aydin Data Transmission Test Set (DTTS), otherwise known as the Low Data Rate Bit Error Rate Test Set (LDR BERTS)

In response to this command, the PTE shall set up the BERTS for Second Test Mode with the BER option selected. This command specifies the TEST INTERVAL (number of bit cycles for each BER measurement) and the TEST PERIOD, which specifies the total test time (normally the service time) of the test to be performed. Test measurements and elapsed time shall continue during an out of sync condition, which shall be reported as status. Resync is automatically performed by the BERTS.

The DTTS runs the test for the TEST PERIOD specified, and updates its status upon completion of each test interval. Note that the interval duration is data rate dependent. The data rate is specified in the PTE_MOD_SPECIFIC_CONFIGURATION_CMD. The PTE Modulator provides the XMIT clock to the BERTs as an external input, set to the data rate specified.

Once a BER test is started, it may be restarted in the middle of a test by resending this command, with a new set of parameters. The PTE shall initiate a RESET - RUN to the BERTS anytime this command is received.

Command Verification:

BER/TIC/E_b/N_o_MEASUREMENTS_REPORT

The BER TEST completed set to zero will indicate that a RUN was initiated in the BERTs. This parameter shall be reset upon receipt of the start command, in the appropriate command word (I or Q channel). BERTS ERROR CONDITION flags shall indicate a snap shot of the status of the BERT in the current 1 pps report period. Upon completion of the BER test, the BER TEST COMPLETE status shall indicate that the TEST PERIOD has completed.

Format:

PTE_MOD_START_RTN_BER_TEST_CMD (CONT)

BYTE #	BIT # S	TYPE	RANGE	UNITS	RESOLUTION	DESCRIPTION
1 - 2	15 - 0	HEX	AA55	N/A	N/A	**START CHECKWORD**
3	7 - 0	BIN	1 - 3	N/A	N/A	**I COMMAND WORD** 1 = START TEST RET I CHANNEL 2 = STOP TEST RET I CHANNEL 3 = NO CHANGE
4	7 - 0	BIN	3 - 10	10^X bits	LSB = 1	**RETURN I TEST INTERVAL** Specifies Exponent for BER measurement interval, from 10^3 to 10^{10} bits.
5 - 8	31 - 0	BIN	0 - 99,999	SEC	1	**RETURN I TEST PERIOD** Specifies BER test duration
9	7 - 0	BIN	1 - 3	N/A	N/A	**Q COMMAND WORD** 1 = Start Test Ret Q Channel 2 = Stop Test Ret Q Channel 3 = No Change
10	7 - 0	BIN	3 - 10	10^X bits	LSB = 1	**RETURN Q TEST INTERVAL** Specifies Exponent for BER measurement interval, from 10^3 to 10^{10} bits.
11 - 14	31 - 0	BIN	0 - 99,999	SEC	1	**RETURN Q TEST PERIOD** Specifies BER test duration
15 - 16	15 - 0	HEX	55AA	N/A	N/A	**END CHECKWORD**

PTE_MOD_MEASURE_TIME_INTERVAL_CMD

Description:
Type: Asynchronous

Sets up and initiates Time Interval testing for Return Channel Data Delay of the Return I and/or Q channels via the HP 5316B Universal Counter.

In response to this command, the PTE shall set up the Universal Counter (also called the Time Interval Counter or TIC) for the Time Interval A → B mode, positive slope trigger. In this mode, the Universal Counter is set up to make a one shot measurement of the delay between the Pattern Sync Transmit Pulse and the Pattern Sync Receive Pulse of the associated BERTS (I or Q channel BERTS). These sync pulses in the BERTS are square waves which alternate once during each pattern cycle. Obviously, for the receive pulse to be valid, this measurement must be made only when the BERTS indicates pattern sync. The ADPE shall ensure that the appropriate BERTS have bit sync prior to issuing this command.

This command provides the counter with the detection voltage trigger level, approximately at the center of the peak - to - peak Sync Pulse levels.

Command Constraints
In addition to the state table constraints, the appropriate channel in the ERROR CONDITION FLAG of the BER/TIC_MEASUREMENTS_REPORT must indicate SYNC.

Command Verification:

BER/TIC/E_b/N_o_MEASUREMENTS_REPORT
The TIME INTERVAL STATUS parameter shall be set to MEASUREMENT INITIATED I/Q once the PTE has initiated the measurement in the TIC. This parameter shall be set for one and only one 1 pps status period. Once the measurement is valid in the TIC, the PTE shall provide the measurement in the TIME MEASUREMENT I/Q parameter, while at the same time, updating the TIME INTERVAL STATUS parameter to indicate MEASUREMENT VALID I/Q. The MEASUREMENT VALID parameter shall be reset upon receipt of this command. The TIME MEASUREMENT I/Q shall be updated after each measurement.

Format:

PTE_MOD_MEASURE_TIME_INTERVAL_CMD (CONT)

BYTE #	BIT # S	TYPE	RANGE	UNITS	RESOLUTION	DESCRIPTION
1 - 2	15 - 0	HEX	AA55	N/A	N/A	**START CHECKWORD**
3	7 - 0	BIN	0 - 2	N/A	N/A	**COMMAND WORD** Specifies channel(s) for time interval measurement. 0 = MEASURE TIME INTERVAL I CHANNEL 1 = MEASURE TIME INTERVAL Q CHANNEL 2 = MEASURE TIME INTERVAL I AND Q CHANNEL
4	7 - 0	N/A	N/A	N/A	N/A	**TRIGGER SETTING**
	0					0 = I CHANNEL FRONT PANEL 1 = I CHANNEL REMOTE
	1					0 = Q CHANNEL FRONT PANEL 1 = Q CHANNEL REMOTE
	2 - 7					SPARES
5 - 6	15 - 0	BIN	- 2.5 to + 2.5	VOLTS	0.01	**TRIGGER LEVEL I — Pattern Sync Transmit (A)** Specifies I (A) input trigger level for remote setting
7 - 8	15 - 0	BIN	- 2.5 to + 2.5	VOLTS	0.01	**TRIGGER LEVEL I — Pattern Sync Receive (B)** Specifies I (B) input trigger level for remote setting
9 - 10	15 - 0	BIN	- 2.5 to + 2.5	VOLTS	0.01	**TRIGGER LEVEL Q — Pattern Sync Transmit (A)** Specifies Q (A) input trigger level for remote setting
11 - 12	15 - 0	BIN	- 2.5 to + 2.5	VOLTS	0.01	**TRIGGER LEVEL Q — Pattern Sync Receive (B)** Specifies Q (B) input trigger level for remote setting
13 - 14	15 - 0	HEX	55AA	N/A	N/A	**END CHECKWORD**

PTE_DEMOD_SPECIFIC_CONFIGURATION_CMD

Description:

Type: Asynchronous

This command is used for initial configuration or reconfiguration of the PTE DEMOD. The PTE DEMOD reads only the parameters demarcated in the configuration bit map. All others are ignored.

The PTE DEMOD will configure or reconfigure parameters specified in the configuration bit map according to the new data indicated.

Command Verification:

PTE_DEMOD_CONFIGURATION_REPORT

Each Parameter in the configuration command is reflected under a similar name in the configuration report.

Format:

PTE_DEMOD_SPECIFIC_CONFIGURATION_CMD (CONT)

BYTE #	BIT # S	TYPE	RANGE	UNITS	RESOLUTION	DESCRIPTION
1,2	15 - 0	HEX	AA55	N/A	N/A	**START CHECKWORD**
3,4	15 - 0	BIN		N/A	N/A	**CONFIGURATION ITEM BIT MAP** This field identifies whether or not a particular configuration data item is valid. Only items with their corresponding bit set to true in the bit map will be updated.
	0		0 OR 1			1 = SERVICE TYPE
	1		0 OR 1			1 = RANGE CHANNEL FEEDBACK TAPS
	2		0 OR 1			1 = INITIAL A REGISTER VALUE
	3		0 OR 1			1 = SHUTTLE MODE
	4		0 OR 1			1 = SSHF PN RATE
	5		0 OR 1			1 = FORWARD DATA RATE
	6		0 OR 1			1 = TEST TYPE
	7		0 OR 1			1 = FWD BERT PN SEQUENCE LENGTH
	8		0 OR 1			1 = DEMOD IF OFFSET FREQUENCY
	9		0 OR 1			1 = MODULATION TYPE
	10		0 OR 1			1 = MODULATION INDEX
	11		0 OR 1			1 = SUBCARRIER FREQUENCY
	12		0 OR 1			1 = SUBCARRIER - TO - DATA RATE RATIO
	13		0 OR 1			1 = GN DATA FORMAT
	14 - 15					SPARES
5	7 - 0	BIN	1 TO 29	N/A	N/A	**SERVICE TYPE** 1 - 19 = RESERVED 20 = KSAF 21 = KSHF 22 = SSAF 23 = SSHF 24 = SPARE 25 = MAF 26 - 29 = RESERVED
6	7 - 0	BIN	1 OR 2	N/A	N/A	**SHUTTLE MODE** 1 = MODE 1 2 = MODE 2
7 - 10	31 - 0					**RANGE CHANNEL AND SSHF PN CODE FEEDBACK TAPS**
	20 - 0	OCT	1000000 TO 1777777	N/A (2011 to 3045 for SSHF)	N/A	**TAP VALUES**
	31 - 21	BIN	0			**ZERO PAD**

PTE_DEMOD_SPECIFIC_CONFIGURATION_CMD (CONT)

BYTE #	BIT # S	TYPE	RANGE	UNITS	RESOLUTION	DESCRIPTION
11 - 12	15 - 0					**COMMAND CH. REGISTER A INITIAL VALUE**
	6 - 0	BIN	0000000 TO 1111111	N/A	N/A	7 Bit Register Fill
	15 - 7	BIN	0			**ZERO PAD**
13 - 16	31 - 0	BIN INT	11.2 M to 11.3 M	chips/s	LSB = 1	**SSHF PN CODE RATE**
17 - 20	31 - 0	BIN INT	100 TO 25,000,000	BPS	LSB = 1	**FORWARD DATA RATE**
21	7 - 0	BIN	1 - 2	N/A	N/A	**TEST TYPE** 1 = INTERNAL LOOP TEST 2 = END - TO - END TEST
22	7 - 0	BIN	5, 9, 11, 20, OR 23	N/A	LSB = 1	**FWD BERT PN SEQ LENGTH** DEFAULT = 11
23 - 26	31 - 0	BIN	- 2 MHz TO +2 MHz	Hz	LBS =1 Hz	**DEMOD IF OFFSET FREQUENCY, df_D**
27	7 - 0	BIN	1 TO 4	N/A	N/A	**MODULATION TYPE** 1 = SN (SUPPRESSED CARRIER) 2 = GN, DIRECT PHASE MODULATION 3 = GN, SUBCARRIER, SINEWAVE 4 = GN, SUBCARRIER, SQUAREWAVE
28	7 - 0	BIN	0.22 TO 1.5, OR 0	RADIANS	LSB = 0.1	**MODULATION INDEX FOR GN MODES** (0 = BPSK)
29, 30	15 - 0	BIN	2,000 TO 16,000	Hz	1 Hz	**SUBCARRIER FREQUENCY**
31	7 - 0	BIN	2,4,8,16,32, 64,128	N/A	N/A	**SUBCARRIER–TO–DATA RATE RATIO**
32	7 - 0	BIN	1 TO 6	N/A	N/A	**GN DATA FORMAT** 1 = NRZ - L 2 = NRZ - M 3 = NRZ - S 4 = BIPhase - L 5 = BIPhase - M 6 = BIPhase - S
33, 34	15 - 0	HEX	55AA	N/A	N/A	**END CHECKWORD**

PTE_DEMOD_COMMON_CONFIGURATION_CMD

Description:

Type: Asynchronous

This command is used for initial configuration or reconfiguration of the forward parameters of the PTE DEMOD. The PTE DEMOD reads only the parameters demarcated in the configuration bit map. All others are ignored.

The PTE DEMOD will configure or reconfigure parameters specified in the configuration bit map according to the new data indicated.

Command Verification:

PTE_DEMOD_CONFIGURATION_REPORT

Each Parameter in the configuration command is reflected under a similar name in the configuration report.

Format:

PTE_DEMOD_COMMON_CONFIGURATION_CMD (CONT)

BYTE #	BIT # S	TYPE	RANGE	UNITS	RESOLUTION	DESCRIPTION
1,2	15 - 0	HEX	AA55	N/A	N/A	**START CHECKWORD**
3 - 6	31 - 0					**SPARE**
7,8	15 - 0	BIN	0 OR 1	N/A	N/A	**BIT MAP**
	0					1 = FWD IF OFFSET FREQUENCY
	1					1 = FWD TRANSLATION FREQ
	2					1 = PN MODULATION CONFIGURATION
	3					**RESERVED** (DOPPLER COMPENSATION CONFIGURATION)
	4					1 = FWD SWEEP SELECT
	5					1 = GN FWD SWEEP DURATION
	6					1 = GN FWD SWEEP RANGE
	7 - 15					SPARES
9 - 12	31 - 0	BIN	+/- 2 MHz	HZ	LSB = 1 Hz	**FORWARD IF OFFSET FREQUENCY, df_F** Specifies fixed offset to apply to 370 MHz for base IF
13 - 16	31 - 0	BIN	1000 MHz to 13500 MHz	HZ	LSB = 1KHz	**FORWARD TRANSLATION FREQUENCY, f_{tf}** (370 MHz + OFFSET + FWD TRANS = USER RECEIVE FREQUENCY)
17	7 - 0	BIN	0 OR 1	N/A	N/A	**FORWARD PN MODULATION CONFIGURATION**
	0					1 = PN MODULATION ON
						0 = PN MODULATION OFF (BPSK COMMAND CHANNEL)
	1 - 7					SPARES
18	7 - 0					**RESERVED** (DOPPLER COMPENSATION CONFIGURATION)
19	7 - 0	BIN	1 OR 2	N/A	N/A	**SN/GN FORWARD SWEEP SELECT** 1 = SN SWEEP 2 = GN SWEEP
20	7 - 0	BIN	1 TO 120	SECONDS	LSB = 1	**GN FORWARD SWEEP DURATION**
21, 22	15 - 0	BIN	10 TO 600,000	Hz	LSB = 10	**GN FORWARD SWEEP RANGE**
23 - 24	15 - 0	HEX	55AA	N/A	N/A	**END CHECKWORD**

PTE_DEMOD_START_ACQUISITION_CMD

Description:

Type: Asynchronous

This command initiates acquisition when configuration has been processed.

Command Verification:

DEMOD_PERFORMANCE_REPORT

The OPERATING STATE parameter shall be set for ACQUISITION, during the acquisition state.

Note: If acquisition occurs very quickly, it is possible that the next state observed is TRACK.

Format:

BYTE #	BIT # S	TYPE	RANGE	UNITS	RESOLUTION	DESCRIPTION
1,2	15 - 0	HEX	AA55	N/A	N/A	**START CHECKWORD**
3,4	15 - 0	HEX	55AA	N/A	N/A	**END CHECKWORD**

PTE_DEMOD_START_PN_MODEL_CMD

Description:

Type: Synchronous

Supplies forward PN epoch time for spread modes. Start of this command shall reset all forward control commands in the PN model (such as doppler control, etc.). In addition, this shall cause the PTE DEMOD PN Model status to reflect PN Model in progress.

Command Verification:

DEMOD_PERFORMANCE_REPORT

Observe PN MODEL STARTED in the PN MODEL STATUS parameter.

Format:

BYTE #	BIT # S	TYPE	RANGE	UNITS	RESOLUTION	DESCRIPTION
1,2	15 - 0	HEX	AA55	N/A	N/A	**START CHECKWORD**
3	7 - 0	BIN	0 - 23	HOURS	LSB = 1	**EFFECTIVE TIME HOURS**
4	7 - 0	BIN	0 - 59	MINUTES	LSB = 1	**EFFECTIVE TIME MINUTES**
5	7 - 0	BIN	0 - 59	SECONDS	LSB = 1	**EFFECTIVE TIME SECONDS**
6	7 - 0	N/A	N/A	N/A	N/A	**SPARE**
7, 8	15 - 0	HEX	55AA	N/A	N/A	**END CHECKWORD**

PTE_DEMOD_START_FWD_BER_TEST_CMD

Description:

Type: Asynchronous

Sets up and initiates Bit Error Rate (BER) testing of the Forward Channel via the Aydin Data Transmission Test Set (DTTS), otherwise known as the CMD channel Bit Error Rate Test - set (BERT).

In response to this command, the PTE shall set up the CMD BERT for Second Mode Test with the BER option selected. This command specifies the TEST INTERVAL (number of bit cycles for each BER measurement) and the TEST PERIOD, which specifies the total test time (normally the service time) of the test to be performed. Test measurements and elapsed time shall continue during and out of sync condition, which shall be reported as status. Resync is automatically performed by the CMD BERT.

The CMD BERT runs the test for the TEST PERIOD specified, and updates its status upon completion of each test interval. Note that the interval duration is data rate dependent. The data rate is specified in the PTE_DEMOD_SPECIFIC_CONFIGURATION_CMD. The PTE Modulator provides the XMIT clock to the DTTS as an external input, set to the data rate specified.

Once a BER test is started, it may be restarted in the middle of a test by resending this command, with a new set of parameters. The PTE shall initiate a RESET - RUN to the BERT anytime this command is received.

Command Verification:

BER/TIC/E_b/N_o_MEASUREMENTS_REPORT

The BER TEST complete set to zero will indicate that a RUN was initiated in the BERT. This parameter shall be reset upon receipt of the start command, in the appropriate command word. BERTS ERROR CONDITION flag shall indicate a snapshot of the status of the BERT in the current 1pps report period. Upon completion of the BER test, the BEP TEST COMPLETE status shall indicate that the BER TEST PERIOD has completed.

Format:

PTE_DEMOD_START_FWD_BER_TEST_CMD (CONT)

BYTE #	BIT # S	TYPE	RANGE	UNITS	RESOLUTION	DESCRIPTION
1 - 2	15 - 0	HEX	AA55	N/A	N/A	**START CHECKWORD**
3	7 - 0	BIN	1 OR 2	N/A	N/A	**FWD COMMAND WORD** 1 = START TEST FWD CHANNEL 2 = STOP TEST FWD CHANNEL
4	7 - 0	BIN	3 - 10	10^X bits	LSB = 1	**FWD TEST INTERVAL** Specifies BER measurement interval, from 10^3 to 10^{10} bits, where this parameter specifies the exponent.
5 - 8	31 - 0	BIN	0 - 99,999	SEC	1	**FWD TEST PERIOD** Specifies BER test duration
9 - 10	15 - 0	HEX	55AA	N/A	N/A	**END CHECKWORD**

PTE_DEMOD_RANGE_CHANNEL_REACQUISITION

Description:

Type: Asynchronous

This command may be issued during internal loop tests of non - shuttle services, after acquisition and tracking of the command channel has been achieved.

In response to this command, the PTE demod shall acquire and track the range channel PN code.

Command Verification:

PTE_DEMOD_PERFORMANCE_REPORT

Observe LOCK STATUS parameter and insure that the RANGE channel is being tracked.

Format:

BYTE #	BIT # S	TYPE	RANGE	UNITS	RESOLUTION	DESCRIPTION
1 - 2	15 - 0	HEX	AA55	N/A	N/A	**START CHECKWORD**
3 - 4	15 - 0	HEX	55AA	N/A	N/A	**END CHECKWORD**

H6.4 PTE STATUS REPORTS

SUMMARY OF PTE STATUS TABLES:

PTE_MOD_CONFIGURATION_REPORT
PTE_MOD_PERFORMANCE_REPORT
PTE_DEMOD_CONFIGURATION_REPORT
PTE_DEMOD_PERFORMANCE_REPORT
PTE_EXTENDED_BIT_REPORT
PTE_GENERAL_STATUS_REPORT
PTE_BER/TIC_MEASUREMENTS_REPORT

PTE_MOD_CONFIGURATION_REPORT

Description:

Reports configuration of the unit. The parameters of this report correspond to the parameters of the PTE_MOD_CONFIGURATION_CMD.

Format:

BYTE #	BIT #S	TYPE	RANGE	UNITS	RESOLUTION	ACCURACY	DESCRIPTION
1 - 2	15 - 0	HEX	AA55	N/A	N/A	N/A	**START CHECKWORD**
3 - 4	15 - 0	BIN	1 - 366	DAYS	LSB = 1	CTFS	**REPORT TIME DAY**
5	7 - 0	BIN	0 - 23	HOURS	LSB = 1	CTFS	**REPORT TIME HOURS**
6	7 - 0	BIN	0 - 59	MINS	LSB = 1	CTFS	**REPORT TIME MINUTES**
7	7 - 0	BIN	0 - 59	SECS	LSB = 1	CTFS	**REPORT TIME SECONDS**
8	7 - 0	BIN	N/A	N/A	N/A	N/A	**SPARE**
9	7 - 0	BIN	1 TO 29	N/A	N/A	N/A	**SERVICE TYPE** 1 = KSAR, DG - 1, COHERENT 2 = KSAR, DG - 1, NONCOHERENT 3 = SPARE 4 = KSAR, DG - 2, MODE 1 5 = KSAR, DG - 2, MODE 2 6 = KSHR, MODE 1 7 = KSHR, MODE 2 8 = SSAR, DG - 1, COHERENT 9 = SSAR, DG - 1, NONCOHERENT 10 = SPARE 11 = SSAR, DG - 2, MODE 1 12 = SSAR, DG - 2, MODE 2 13 = SSHR, MODE 1 OR 2 14 = RESERVED 15 = SPARE 16 = SPARE 17 = SSHR, COHERENT 18 = MAR, DG - 1, MODE 1 19 = MAR, DG - 1, MODE 2 20 = RESERVED(KSAF) 21 = RESERVED(KSHF) 22 = RESERVED(SSAF) 23 = RESERVED(SSHF) 24 = SPARE 25 = RESERVED (MAF) 26 - 29 = RESERVED

PTE_MOD_CONFIGURATION_REPORT (CONT)

BYTE #	BIT #S	TYPE	RANGE	UNITS	RESOLUTION	ACCURACY	DESCRIPTION
10	7 - 0	BIN					**SETUP MISCELLANEOUS PARAMETERS**
	0						Reserved for commonality (SSA COMBINING)
	1		0 OR 1	N/A	N/A	N/A	SSA INTERLEAVING I: 1 = ON 0 = OFF
	2		0 OR 1	N/A	N/A	N/A	SSA INTERLEAVING Q: 1 = ON 0 = OFF
	3						SPARE
	4		0 OR 1	N/A	N/A	N/A	I ENCODING G2 INVERSION 1 = INVERTED 0 = NOT INVERTED
	5		0 OR 1	N/A	N/A	N/A	Q ENCODING G2 INVERSION 1 = INVERTED 0 = NOT INVERTED
	6 - 7						SPARE
11	7 - 0						SPARE

PTE_MOD_CONFIGURATION_REPORT (CONT)

BYTE #	BIT #S	TYPE	RANGE	UNITS	RESOLUTION	ACCURACY	DESCRIPTION
12	7 - 0	BIN	6 (4:1) 0 (1:1) - 3 (1:2) - 6 (1:4)	dB	LSB= 0.1	N/A	**I/Q POWER RATIO, SINGLE/DUAL CHANNEL MODULATION = 1—6**
			2 TO 15	RADIANS	LSB = 0.1	N/A	**MODULATION INDEX, SINGLE/DUAL CHANNEL MODULATION = 7—9**
13	7 - 0	BIN	1 TO 6	N/A	N/A	N/A	**I DATA FORMAT** 1 = NRZ - L 2 = NRZ - M 3 = NRZ - S 4 = BIPhase - L 5 = BIPhase - M 6 = BIPhase - S
14	7 - 0	BIN	1 TO 6	N/A	N/A	N/A	**Q DATA FORMAT** 1 = NRZ - L 2 = NRZ - M 3 = NRZ - S 4 = BIPhase - L 5 = BIPhase - M 6 = BIPhase - S
15	7 - 0	BIN	1 TO 5	N/A	N/A	N/A	**I ENCODING** 1 = UNCODED 2 = CODE 1 (R=1/2) 3 = CODE 2 (R=1/2) 4 = CODE 3 (R=1/3) 5 = CODE 4 (R=1/3, SHUTTLE)
16	7 - 0	BIN	1 TO 5	N/A	N/A	N/A	**Q ENCODING** 1 = UNCODED 2 = CODE 1 (R=1/2) 3 = CODE 2 (R=1/2) 4 = CODE 3 (R=1/3) 5 = CODE 4 (R=1/3) (SHUTTLE MODE) This is not configured, but is reported for shuttle mode

PTE_MOD_CONFIGURATION_REPORT (CONT)

BYTE #	BIT #S	TYPE	RANGE	UNITS	RESOLUTION	ACCURACY	DESCRIPTION
17	7 - 0	BIN	1 TO 2	N/A	N/A	N/A	**I SYMBOL FORMAT** 1 = NRZ 2 = BIPHASE
18	7 - 0	BIN	1 TO 2	N/A	N/A	N/A	**Q SYMBOL FORMAT** 1 = NRZ 2 = BIPHASE
19							**JITTER TEST CLOCK INPUT CONTROL** Reports whether TM Return Modulator is configured to internally generate its symbol clock (Disabled) or to use an externally provided clock (Enabled). Normal operations always require the "Disabled" setting; "Enabled" is for special testing only.
	0	BIN	0 OR 1	N/A	N/A	N/A	I - CHANNEL JITTER CLOCK INPUT 0 = DISABLED 1 = ENABLED
	1	BIN	0 OR 1	N/A	N/A	N/A	Q - CHANNEL JITTER CLOCK INPUT 0 = DISABLED 1 = ENABLED
	2 - 7						SPARE
20	7 - 0	BIN	1 TO 9	N/A	N/A	N/A	**SINGLE / DUAL CHANNEL MODULATION** 1 = I CHANNEL BPSK 2 = Q CHANNEL BPSK 3 = SINGLE CHANNEL DG - 1 QPSK 4 = SINGLE CHANNEL SQPSK ALT DATA BITS 5 = SINGLE CHANNEL SQPSK ALT CODED SYMBOLS 6 = DUAL CHANNEL QPSK 7 = SINGLE CHANNEL PM 8 = SINGLE CHANNEL SINEWAVE SUBCARRIER 9 = SINGLE CHANNEL SQUAREWAVE SUBCARRIER
21 - 24	31 - 0	BIN	100 Bps TO 12 MBPS	BPS	LSB = 1	N/A	**I DATA RATE**
25 - 28	31 - 0	BIN	100 TO 150,000,000	BPS	LSB = 1	N/A	**Q DATA RATE, SINGLE/DUAL CHANNEL MODULATION = 1—6** - OR -
			25,000 TO 3,000,000	Hz	LSB = 1		**SUBCARRIER FREQUENCY, SINGLE/DUAL CHANNEL MODULATION = 8—9**

PTE_MOD_CONFIGURATION_REPORT (CONT)

BYTE #	BIT #S	TYPE	RANGE	UNITS	RESOLUTION	ACCURACY	DESCRIPTION
29 - 32	31 - 0						**RETURN LINK MODE 1 and 3 FEEDBACK TAPS**
	20 - 0	OCT	1000000 TO 1777777	N/A	N/A	N/A	Tap Values
	31 - 32	BIN	0				**ZERO PADS**
33 - 34	15 - 0						**INITIAL A REGISTER VALUE**
	11 - 0	OCT	0001 TO 3777	N/A	N/A	N/A	Initial Register Fill
	15 - 12	BIN	0				**ZERO PAD**
35 - 36	15 - 0						**INITIAL C REGISTER VALUE**
	11 - 0	OCT	0001 TO 3777	N/A	N/A	N/A	Initial Register Fill
	15 - 12	BIN	0				**ZERO PAD**
37	7 - 0	BIN	0 TO 1	N/A	N/A	N/A	**I DATA SOURCE** 0 = INTERNAL (BERTS) 1 = EXTERNAL (DIS)
38	7 - 0	BIN	0 TO 1	N/A	N/A	N/A	**Q DATA SOURCE** 0 = INTERNAL (BERTS) 1 = EXTERNAL (DIS)
39	7 - 0	BIN	0 TO 1	N/A	N/A	N/A	**NOISE ON / OFF** 0 = OFF 1 = ON
40	7 - 0						**SPARE**
41 - 42	15 - 0	BIN	27 - 88	dB - Hz	1	N/A	**C/N_o SETTING**
43	7 - 0	BIN	5,9,11, 20,23	N/A	N/A	N/A	**I BERT PN LENGTH** Default = 11
44	7 - 0	BIN	5,9,11, 20,23	N/A	N/A	N/A	**Q BERT PN LENGTH** Default = 11
45	7 - 0	BIN INT	1 TO 2	N/A	N/A	N/A	**NOMINAL IF OUTPUT FREQ** (To which static and dynamic offsets are applied.) 1 = 8.5 MHz 2 = 370 MHz
46	7 - 0	BIN INT	1 TO 2	N/A	N/A	N/A	**KSAR OUTPUT CONFIG—URATION** 1 = Modulated 370 MHz Carrier 2 = Unmodulated 370 MHz Plus Baseband I - Channel

PTE_MOD_CONFIGURATION_REPORT (CONT)

BYTE #	BIT #S	TYPE	RANGE	UNITS	RESOLUTION	ACCURACY	DESCRIPTION
47	7 - 0	BIN INT	1 TO 3	N/A	N/A	N/A	**SERVICE MODE** Provides further definition for Service types 1, 8, and 13. 1 = MODE 1 2 = MODE 2 3 = MODE 3
48	7 - 0						**SPARE**
49 - 52	31 - 0	BIN	+ 1600 MHz to + 14000 MHz	HZ	LSB = 1KHz	N/A	**RETURN LOOP TEST TRANSLATION FREQUENCY, f_{trl}**
53 - 56	31 - 0	BIN	- 2 MHz to + 2 MHz	Hz	LSB=1Hz	N/A	**RETURN MODULATOR IF OFFSET FREQUENCY, df_M**
57 - 58	15 - 0	HEX	55AA	N/A	N/A	N/A	**END CHECKWORD**

PTE_MOD_PERFORMANCE_REPORT

Description: Provides performance status for the Modulator.

Format:

BYTE #	BIT #S	TYPE	RANGE	UNITS	RESOLUTION	ACCURACY	DESCRIPTION
1,2	15 - 0	HEX	AA55	N/A	N/A	N/A	**START CHECKWORD**
3,4	15 - 0	BIN	1 - 366	DAYS	LSB = 1	CTFS	**REPORT TIME DAY**
5	7 - 0	BIN	0 - 23	HOURS	LSB = 1	CTFS	**REPORT TIME HOURS**
6	7 - 0	BIN	0 - 59	MINS	LSB = 1	CTFS	**REPORT TIME MINUTES**
7	7 - 0	BIN	0 - 59	SECS	LSB = 1	CTFS	**REPORT TIME SECONDS**
8	7 - 0	BIN		N/A	N/A	N/A	**INPUT DATA SYNCHRONIZ–ER LOCK STATUS**
	0		0 OR 1				1 = I DATA CLOCK LOCKED
	1		0 OR 1				1 = Q DATA CLOCK LOCKED
	2 - 7						SPARE

PTE_MOD_PERFORMANCE_REPORT (CONT)

BYTE #	BIT #S	TYPE	RANGE	UNITS	RESOLUTION	ACCURACY	DESCRIPTION
9 - 12	31 - 0	BIN	0 - 1 PER BIT	N/A	N/A	N/A	**COMMANDS NOT EXECUTED MAP** Indicates commands not executed at specified time of execution that were suppose to execute in the previous second.
	0						RESERVED
	1		0 or 1	N/A	N/A	N/A	SET STATE
	2						RESERVED
	3		0 or 1	N/A	N/A	N/A	MOD CONFIGURATION
	4						RESERVED
	5						SPARE
	6						SPARE
	7		0 or 1	N/A	N/A	N/A	DOWNLOAD
	8						RESERVED
	9						RESERVED
	10		0 or 1	N/A	N/A	N/A	START SERVICE
	11						RESERVED
	12						RESERVED
	13		0 or 1	N/A	N/A	N/A	START RTN BER TEST
	14						RESERVED
	15		0 or 1	N/A	N/A	N/A	MEASURE TIME INTERVAL
	16						RESERVED
	17						RESERVED
	18		0 or 1	N/A	N/A	N/A	CONFIGURE GENERAL
	19		0 or 1	N/A	N/A	N/A	RANGE CHANNEL REACQUISITION
	20		0 or 1	N/A	N/A	N/A	EPHEMERIS DATA DOWNLOAD
	21 - 31						RESERVED

PTE_MOD_PERFORMANCE_REPORT (CONT)

BYTE #	BIT #S	TYPE	RANGE	UNITS	RESOLUTION	ACCURACY	DESCRIPTION
13 - 16	31 - 0	BIN	0 - 1 PER BIT	N/A	N/A	N/A	**COMMANDS NOT ACCEPTED MAP** Commands which were im - mediately rejected within the past second.
	0		0 or 1	N/A	N/A	N/A	RESERVED
	1		0 or 1	N/A	N/A	N/A	SET STATE
	2		0 or 1	N/A	N/A	N/A	RESERVED
	3		0 or 1	N/A	N/A	N/A	MOD CONFIGURATION
	4		0 or 1	N/A	N/A	N/A	RESERVED
	5		0 or 1	N/A	N/A	N/A	SPARE
	6		0 or 1	N/A	N/A	N/A	SPARE
	7		0 or 1	N/A	N/A	N/A	DOWNLOAD
	8		0 or 1	N/A	N/A	N/A	RESERVED
	9		0 or 1	N/A	N/A	N/A	RESERVED
	10		0 or 1	N/A	N/A	N/A	START SERVICE
	11		0 or 1	N/A	N/A	N/A	RESERVED
	12		0 or 1	N/A	N/A	N/A	RESERVED
	13		0 or 1	N/A	N/A	N/A	START RTN BER TEST
	14		0 or 1	N/A	N/A	N/A	RESERVED
	15		0 or 1	N/A	N/A	N/A	MEASURE TIME INTERVAL
	16		0 or 1	N/A	N/A	N/A	RESERVED
	17		0 or 1	N/A	N/A	N/A	RESERVED
	18		0 or 1	N/A	N/A	N/A	CONFIGURE GENERAL
	19		0 or 1	N/A	N/A	N/A	RANGE CHANNEL REACQUISITION
	20		0 or 1	N/A	N/A	N/A	EPHEMERIS DATA DOWN - LOAD
	21 - 31						RESERVED

PTE_MOD_PERFORMANCE_REPORT (CONT)

BYTE #	BIT #S	TYPE	RANGE	UNITS	RESOLUTION	ACCURACY	DESCRIPTION
17	7 - 0	BIN	0 - 2	N/A	N/A	N/A	**COMMAND NOT EXECUTED ERROR CODE** REPORTS REASON WHY THE LAST COMMAND NOT EX - ECUTED WAS NOT EX ECUTED. 0 = NO ERROR 1 = ILLEGAL STATE The commands effective time was during a state not allowed in accordance with the state table. 2 = ALREADY IN PROGRESS A commands effective time was during the execution time of the same command sent previously.
18	7 - 0	BIN	0 - 8	N/A	N/A	N/A	**COMMAND NOT ACCEPTED ERROR CODE** REPORTS REASON WHY THE LAST COMMAND NOT AC - CEPTED WAS NOT ACCEPTED 0 = NO ERROR 1 = INSUFFICIENT NOTIFICA - TION Synchronous command received too close to effective time 2 = EFFECTIVE TIME IN PAST Synchronous command was received after effective time. 3 = INVALID SUBADDRESS 4 = INCORRECT COMMAND SIZE 5 = INCOMPLETE CONFIGU RATION (Indicates that the con - figuration data needed was not supplied to execute the last com - mand) 6 = INCORRECT EPHEMERIS TABLE SIZE (More than 10 minutes of data) 7 = EFFECT TIME greater than 60 minutes into the future. 8 = EPHEMERIS PROTOCOL ERROR

PTE_MOD_PERFORMANCE_REPORT (CONT)

BYTE #	BIT #S	TYPE	RANGE	UNITS	RESOLUTION	ACCURACY	DESCRIPTION
19	7 - 0	BIN	1 TO 5	N/A	N/A	N/A	**OPERATING STATE** 1 = STANDBY 2 = EXTENDED BIT 3 = CONFIGURED 4 = CONFIGURATION IN PROGRESS 5 = IN SERVICE
20	7 - 0	BIN	N/A	N/A	N/A	N/A	**SPARE**
21 - 24	31 - 0	BIN	- 2.0 MHz to +2.0 MHz	HZ	.01	.012	**DELTA CARRIER FREQUENCY** Difference from Nominal IF (either 370 MHz or 8.5 MHz)
25	7 - 0	BIN	0 OR 1	N/A	N/A	N/A	**EPHEMERIS STATUS**
	0						**SPARE**
	1						1 = UPDATE COMPLETE
	2 - 7						SPARE
26	7 - 0	BIN	N/A	N/A	N/A	N/A	**Reserved for commonality**
27 - 28	15 - 0	HEX	55AA	N/A	N/A	N/A	**END CHECKWORD**

PTE_DEMOD_CONFIGURATION_REPORT

Description: Reports configuration of the unit. The contents of this report contain the parameters as specified by both the PTE_DEMOD_COMMON_CONFIGURATION_CMD and PTE_DEMOD_SPECIFIC_CONFIGURATION_CMD commands.

Format:

BYTE #	BIT #S	TYPE	RANGE	UNITS	RESOLUTION	ACCURACY	DESCRIPTION
1,2	15 - 0	HEX	AA55	N/A	N/A	N/A	**START CHECKWORD**
3,4	15 - 0	BIN	1 - 366	DAYS	LSB = 1	CTFS	**REPORT TIME DAY**
5	7 - 0	BIN	0 - 23	HOURS	LSB = 1	CTFS	**REPORT TIME HOURS**
6	7 - 0	BIN	0 - 59	MINS	LSB = 1	CTFS	**REPORT TIME MINUTES**
7	7 - 0	BIN	0 - 59	SECS	LSB = 1	CTFS	**REPORT TIME SECONDS**
8	7 - 0	BIN	1 - 29	N/A	N/A	N/A	**SERVICE TYPE** 1 - 19 = RESERVED 20 = KSAF 21 = KSHF 22 = SSAF 23 = SSHF 24 = SPARE 25 = MAF 26 - 29 = RESERVED
9 - 12	31 - 0						**RANGE CHANNEL AND SSHF FEEDBACK TAPS**
	20 - 0	OCT	1000000 TO 1777777	N/A (2011 TO 3045 for SSHF)	N/A	N/A	TAP VALUES
	31 - 21	BIN	0				**ZERO PADS**
13, 14	15 - 0						**COMMAND CH. REGISTER A VALUE**
	6 - 0	BIN	0000000 TO 1111111	N/A	N/A	N/A	Initial Register Fill
	15 - 7	BIN	0				**ZERO PADS**
15	7 - 0	BIN	1 OR 2	N/A	N/A	N/A	**SHUTTLE MODE** 1 = MODE 1 2 = MODE 2
16	7 - 0	BIN	0 - 1	N/A	N/A	N/A	**FORWARD PN MODULATION CONFIGURATION** 1= PN MODULATION ON 0 = PN MODULATION OFF (BPSK COMMAND CHANNEL)
17	7 - 0						**RESERVED** (Doppler Comp Config)
18	7 - 0	N/A	N/A	N/A	N/A	N/A	**SPARE**
19 - 22	31 - 0	BIN	11.2 TO 11.3 M	chips/s	LSB = 1	N/A	**SSHF PN CODE RATE**

PTE_DEMOD_CONFIGURATION_REPORT (CONT)

BYTE #	BIT #S	TYPE	RANGE	UNITS	RESOLUTION	ACCURACY	DESCRIPTION
23 - 26	31 - 0	BIN	100 TO 25,000,000	BPS	LSB = 1	N/A	**FORWARD DATA RATE**
27	7 - 0	BIN	1 - 2	N/A	N/A	N/A	**TEST TYPE** 1 = INTERNAL LOOP TEST 2 = END - TO - END TEST
28	7 - 0	BIN	5,9,11,20,23	N/A	N/A	N/A	**FWD BERT PN SEQ LENGTH**
29 - 32	31 - 0	BIN	- 2MHz to + 2 MHz	Hz	LSB = 1 Hz	N/A	**FORWARD IF OFFSET FREQ, df_F**
33 - 36	31 - 0	BIN	1000 MHz to 13500 MHz	Hz	LSB=1 KHz	N/A	**FORWARD TRANSLATION FREQ, f_{tf}**
37 - 40	31 - 0	BIN	- 2 MHz TO +2 MHz	Hz	LSB = 1 Hz	N/A	**DEMOD IF OFFSET** FREQUENCY, df_D
41	7 - 0	BIN	1 TO 4	N/A	N/A	N/A	**MODULATION TYPE** 1 = SN (SUPPRESSED CARRIER) 2 = GN, DIRECT PHASE MODULATION 3 = GN, SUBCARRIER, SINEWAVE 4 = GN, SUBCARRIER, SQUAREWAVE
42	7 - 0	BIN	0.22 TO 1.5, OR 0	radians	LSB = 0.1	N/A	**MODULATION INDEX FOR GN MODES** (0 = BPSK)
43, 44	15 - 0	BIN	1,000 TO 16,000	Hz	1 Hz	N/A	**SUBCARRIER FREQUENCY**
45	7 - 0	BIN	2,4,8,16,32 64,128	N/A	N/A	N/A	**SUBCARRIER—TO—DATA RATE RATIO**
46	7 - 0	BIN	1 TO 6	N/A	N/A	N/A	**GN DATA FORMAT** 1 = NRZ - L 2 = NRZ - M 3 = NRZ - S 4 = BIPhase - L 5 = BIPhase - M 6 = BIPhase - S
47	7 - 0	BIN	1 OR 2	N/A	N/A	N/A	**GN/SN FORWARD SWEEP SELECT** 1 = SN SWEEP 2 = GN SWEEP
48	7 - 0	BIN	1 TO 120	seconds	LSB = 1	N/A	**FORWARD SWEEP DURATION**
49, 50	15 - 0	BIN	10 TO 600,000	Hz	LSB = 10	N/A	**FORWARD SWEEP RANGE**
51, 52	15 - 0	HEX	55AA	N/A	N/A	N/A	**END CHECKWORD**

PTE_DEMOD_PERFORMANCE_REPORT

Description: Reports configuration of the unit. The contents of this report contain the parameters as specified by both the specific and common configuration configuration commands.

Format:

BYTE #	BIT #S	TYPE	RANGE	UNITS	RESOLUTION	ACCURACY	DESCRIPTION
1,2	15 - 0	HEX	AA55	N/A	N/A	N/A	**START CHECKWORD**
3,4	15 - 0	BIN	1 - 366	DAYS	LSB = 1	CTFS	**REPORT TIME DAY**
5	7 - 0	BIN	0 - 23	HOURS	LSB = 1	CTFS	**REPORT TIME HOURS**
6	7 - 0	BIN	0 - 59	MINS	LSB = 1	CTFS	**REPORT TIME MINUTES**
7	7 - 0	BIN	0 - 59	SECS	LSB = 1	CTFS	**REPORT TIME SECONDS**
8	7 - 0	BIN	0 OR 1	N/A	N/A	N/A	**LOCK STATUS**
	0		0 OR 1				1 = PN LOCK
	1		0 OR 1				1 = SYMBOL SYNC LOCK
	2		0 OR 1				RESERVED
	3		0 OR 1				1 = DECODER LOCK
	4		0 OR 1				RESERVED
	5		0 OR 1				1 = MAIN CARRIER LOCK
	6		0 OR 1				CHANNEL BEING TRACKED 0 = COMMAND 1 = RANGE
	7						**SPARE**

PTE_DEMOD_PERFORMANCE_REPORT (CONT)

BYTE #	BIT #S	TYPE	RANGE	UNITS	RESOLUTION	ACCURACY	DESCRIPTION
9 - 12	31 - 0	BIN					**COMMANDS NOT EXECUTED MAP** Indicates commands not executed at specified time of execution that were suppose to execute in the previous second.
	0						RESERVED
	1		0 or 1	N/A	N/A	N/A	SET STATE
	2		0 or 1	N/A	N/A	N/A	COMMON CONFIGURATION
	3						RESERVED
	4		0 or 1	N/A	N/A	N/A	DEMOD SPECIFIC CONFIG
	5						SPARE
	6						SPARE
	7		0 or 1	N/A	N/A	N/A	DOWNLOAD
	8						RESERVED
	9		0 or 1	N/A	N/A	N/A	START ACQUISITION
	10						RESERVED
	11						SPARE
	12		0 or 1	N/A	N/A	N/A	START FWD BER TEST
	13						SPARE
	14		0 or 1	N/A	N/A	N/A	START PN MODEL
	15						RESERVED
	16						RESERVED
	17						RESERVED
	18		0 or 1	N/A	N/A	N/A	PTE GENERAL CONFIGURE
	19		0 or 1	N/A	N/A	N/A	RANGE CHANNEL REACQUISITION
	20		0 or 1	N/A	N/A	N/A	EPHEMERIS DATA
	21 - 31		0 or 1	N/A	N/A	N/A	RESERVED

PTE_DEMOD_PERFORMANCE_REPORT (CONT)

BYTE #	BIT #S	TYPE	RANGE	UNITS	RESOLUTION	ACCURACY	DESCRIPTION
13 - 16	31 - 0	BIN	0 or 1 per bit	N/A	N/A	N/A	**COMMANDS NOT ACCEPTED MAP** Commands which were immediately rejected within the past second.
	0						RESERVED
	1		0 or 1	N/A	N/A	N/A	SET STATE
	2		0 or 1	N/A	N/A	N/A	COMMON CONFIGURATION
	3						RESERVED
	4		0 or 1	N/A	N/A	N/A	DEMOD SPECIFIC CONFIGURATION
	5						SPARE
	6						SPARE
	7		0 or 1	N/A	N/A	N/A	DOWNLOAD
	8						RESERVED
	9		0 or 1	N/A	N/A	N/A	START ACQUISITION
	10						RESERVED
	11						SPARE
	12		0 or 1	N/A	N/A	N/A	START FORWARD BER TEST
	13						SPARE
	14		0 or 1	N/A	N/A	N/A	START PN MODEL
	15						RESERVED
	16						RESERVED
	17						RESERVED
	18		0 or 1	N/A	N/A	N/A	PTE GENERAL CONFIGURE
	19		0 or 1	N/A	N/A	N/A	RANGE CHANNEL REACQUISITION
	20		0 or 1	N/A	N/A	N/A	EPHEMERIS DATA
	21 - 31		0 or1	N/A	N/A	N/A	RESERVED

PTE_DEMOD_PERFORMANCE_REPORT (CONT)

BYTE #	BIT #S	TYPE	RANGE	UNITS	RESOLUTION	ACCURACY	DESCRIPTION
17	7 - 0	BIN	0 - 2	N/A	N/A	N/A	**COMMAND NOT EXECUTED ERROR CODE** REPORTS REASON WHY THE LAST COMMAND NOT EXECUTED WAS NOT EXECUTED. 0 = NO ERROR 1 = ILLEGAL STATE The commands effective time was during a state not allowed in accordance with the state table. 2 = ALREADY IN PROGRESS A commands effective time was during the execution time of the same command sent previously.
18	7 - 0	BIN	0 - 8	N/A	N/A	N/A	**COMMAND NOT ACCEPTED ERROR CODE** REPORTS REASON WHY THE LAST COMMAND NOT ACCEPTED WAS NOT ACCEPTED 0 = NO ERROR 1 = INSUFFICIENT NOTIFICATION Synchronous command received too close to effective time 2 = EFFECTIVE TIME IN PAST Synchronous command was received after effective time.. 3 = INVALID SUBADDRESS 4 = INCORRECT COMMAND SIZE 5 = INCOMPLETE CONFIGURATION (Indicates that the configuration data needed was not supplied to execute the last command) 6 = INCORRECT EPHEMERIS TABLE SIZE 7 = EFFECTIVE TIME GREATER THAN 60 MINUTES IN FUTURE 8 = EPHEMERIS PROTOCOL ERROR
19	7 - 0	BIN	N/A	N/A	N/A	N/A	**SPARE**

PTE_DEMOD_PERFORMANCE_REPORT (CONT)

BYTE #	BIT #S	TYPE	RANGE	UNITS	RESOLUTION	ACCURACY	DESCRIPTION
20	7 - 0	BIN	1 TO 7	N/A	N/A	N/A	**OPERATING STATE** 1 = STANDBY 2 = EXTENDED BIT 3 = CONFIGURED 4 = CONFIGURATION IN PROGRESS 5 = ACQUISITION 6 = TRACK 7 = RESERVED
21 - 22	15 - 0	BIN	0 - 2	N/A	N/A	N/A	**DATA AGC STATUS** 0 = LEVEL LOW 1 = LEVEL OK 2 = LEVEL HIGH
23 - 24	15 - 0	N/A	N/A	N/A	N/A	N/A	**RESERVED**
25 - 26	15 - 0	BIN	0 - 2	N/A	N/A	N/A	**370 MHz IF AGC STATUS** 0 = LEVEL LOW 1 = LEVEL OK 2 = LEVEL HIGH
27 - 28	15 - 0	BIN	0 - 2	N/A	N/A	N/A	**SPARE**
29	7 - 0	BIN					**EPHEMERIS STATUS**
	0						**SPARE**
	1		0 OR 1	N/A	N/A	N/A	1 = EPHEMERIS UPDATE COMPLETE
	2 - 7						SPARE
30	7 - 0	BIN	N/A	N/A	N/A	N/A	**SPARE**
31	7 - 0						**PN MODEL STATUS**
	0	BIN	0 OR 1	N/A	N/A	N/A	1 = PN MODEL STARTED
	1 - 7						SPARES
32	7 - 0						**SPARE**
33 - 34	15 - 0	BIN	- 125 - 100	dB	LSB=0.1	0.5	**E_b/N_o ESTIMATE**
35 - 40	47 - 0						**SPARE**
41 - 44	31 - 0	BIN	- 1 TO 1 SEC	NSEC	LSB = 1 NSEC	16 ns	**RANGE DELAY**
45 - 48	31 - 0	BIN	$\pm 2 \times 10^6$ Cycles	Cycles	LSB =0.001 Cycles	.0058	**INTEGRATED DOPPLER FREQ** For the PTE, this measurement is the difference between the estimated frequency profile and the actual measured frequency
49 - 50	15 - 0	HEX	55AA	N/A	N/A	N/A	**END CHECKWORD**

PTE_GENERAL_STATUS_REPORT

Description: Reports MOD - DEMOD configuration of the unit, as well as confidence test, online BIT, and LOCAL REMOTE configuration.

Format:

BYTE #	BIT #S	TYPE	RANGE	UNITS	RESOLUTION	ACCURACY	DESCRIPTION
1,2	15 - 0	HEX	AA55	N/A	N/A	N/A	**START CHECKWORD**
3,4	15 - 0	BIN	1 - 366	DAYS	LSB = 1	CTFS	**REPORT TIME DAY**
5	7 - 0	BIN	0 - 23	HOURS	LSB = 1	CTFS	**REPORT TIME HOURS**
6	7 - 0	BIN	0 - 59	MINS	LSB = 1	CTFS	**REPORT TIME MINUTES**
7	7 - 0	BIN	0 - 59	SECS	LSB = 1	CTFS	**REPORT TIME SECONDS**
8	7 - 0	BIN	0 TO 1	N/A	N/A	N/A	**MODULATOR FREQUENCY SOURCE** 0 = LOCAL 1 = COHERENTLY DERIVED FROM DEMOD

PTE_GENERAL_STATUS_REPORT (CONT)

BYTE #	BIT #S	TYPE	RANGE	UNITS	RESOLUTION	ACCURACY	DESCRIPTION
9 - 12	31 - 0	BIN		N/A	N/A	N/A	**CONFIDENCE TEST RESULTS BY LRU** Reports status of LRUs as a result of confidence testing. Refer to H3.2.5 for applicable LRUs.
	0		0 or 1				1 = MCP LRU SUSPECT
	1		0 or 1				1 = IEEE - 488 LRU SUSPECT
	2		0 or 1				1 = TIME (MOD) LRU SUSPECT
	3		0 or 1				1 = TDIF LRU SUSPECT
	4		0 or 1				1 = ACQ LRU SUSPECT
	5		0 or 1				1 = PNP LRU SUSPECT
	6		0 or 1				1 = TIME (DEMOD) LRU SUSPECT
	7		0 or 1				1 = DMDP LRU SUSPECT
	8		0 or 1				1 = DMSS LRU SUSPECT
	9		0 or 1				1 = RFDC3 LRU SUSPECT
	10		0 or 1				1 = SYNTH (DEMOD) LRU SUSPECT
	11		0 or 1				1 = SYNTH (MOD) LRU SUSPECT
	12		0 or 1				1 = TMOD LRU SUSPECT
	13		0 OR 1				1 = EXCS LRU SUSPECT
	14		0 or 1				1 = 5V (PS1/PS2) LRU SUSPECT
	15		0 or 1				1 = RF5V (PS1) LRU SUSPECT
	16		0 or 1				1 = 12 V (PS2) LRU SUSPECT
	17		0 or 1				1 = 15 V (PS1) LRU SUSPECT
	18		0 or 1				1 = HIGH UNIT TEMPERATURE
	19		0 or 1				1 = EBNO LRU SUSPECT
	20		0 or 1				1 = BERT (CMD) LRU SUSPECT
	21		0 or 1				1 = BERT (I) LRU SUSPECT
	22		0 or 1				1 = BERT (Q) LRU SUSPECT
	23		0 or 1				1 = TIC (I) LRU SUSPECT
	24		0 or 1				1 = TIC (Q) LRU SUSPECT
	25 - 29						SPARES
	30		0 or 1				1 = TEST COMPLETE 0 = TEST INCOMPLETE
	31		0 or 1				1 = TEST FAILED 0 = TEST PASSED

PTE_GENERAL_STATUS_REPORT (CONT)

BYTE #	BIT #S	TYPE	RANGE	UNITS	RESOLUTION	ACCURACY	DESCRIPTION
13 - 16	31 - 0	BIN		N/A	N/A	N/A	**ONLINE BIT STATUS BY LRU** Reports status of an LRUs as a result of online health monitoring. Refer to H3.2.5 for applicable LRUs.
	0		0 or 1				1 = MCP LRU SUSPECT
	1		0 or 1				1 = IEEE - 488 LRU SUSPECT
	2		0 or 1				1 = TIME (MOD) LRU SUSPECT
	3		0 or 1				1 = TDIF LRU SUSPECT
	4		0 or 1				1 = ACQ LRU SUSPECT
	5		0 or 1				1 = PNP LRU SUSPECT
	6		0 or 1				1 = TIME (DEMOD) LRU SUSPECT
	7		0 or 1				1 = DMDP LRU SUSPECT
	8		0 or 1				1 = DMSS LRU SUSPECT
	9		0 or 1				1 = RFDC3 LRU SUSPECT
	10		0 or 1				1 = SYNTH (DEMOD) LRU SUSPECT
	11		0 or 1				1 = SYNTH (MOD) LRU SUSPECT
	12		0 or 1				1 = TMOD LRU SUSPECT
	13		0 or 1				1 = EXCS LRU SUSPECT
	14		0 or 1				1 = 5V (PS1/PS2) LRU SUSPECT
	15		0 or 1				1 = RF5V (PS1) LRU SUSPECT
	16		0 or 1				1 = 12 V (PS2) LRU SUSPECT
	17		0 or 1				1 = 15 V (PS1) LRU SUSPECT
	18		0 or 1				1 = HIGH UNIT TEMPERATURE
	19		0 or 1				1 = EBNO LRU SUSPECT
	20		0 or 1				1 = BERT (CMD) LRU SUSPECT
	21		0 or 1				1 = BERT (I) LRU SUSPECT
	22		0 or 1				1 = BERT (Q) LRU SUSPECT
	23		0 or 1				1 = TIC (I) LRU SUSPECT
	24		0 or 1				1 = TIC (Q) LRU SUSPECT
	25 - 29						SPARES
	30		0 or 1				1 = TEST COMPLETE 0 = TEST INCOMPLETE
	31		0 or 1				1 = TEST FAILED 0 = TEST PASSED

PTE_GENERAL_STATUS_REPORT (CONT)

BYTE #	BIT #S	TYPE	RANGE	UNITS	RESOLUTION	ACCURACY	DESCRIPTION
17	7 - 0	BIN	0 TO 1	N/A	N/A	N/A	**LOCAL REMOTE** 0 = LOCAL 1 = REMOTE Indicates whether the front panel switch is set to local or remote. Status is provided to the front panel and the SSC independent of this position. Control is locked out of the SSC when in local and locked out from the front panel when remote (except for the local / remote switch).
18	7 - 0	N/A	N/A	N/A	N/A	N/A	**SPARE**
19 - 20	15 - 0	HEX	55AA	N/A	N/A	N/A	**END CHECKWORD**

PTE_EXTENDED_BIT_REPORT

Description: Reports results of Extended BIT. Specified as LRUs failed by test. Refer to H3.2.5 for Extended BIT descriptions, including LRUs used in each test.

Format:

BYTE #	BIT #S	TYPE	RANGE	UNITS	RESOLUTION	ACCURACY	DESCRIPTION
1,2	15 - 0	HEX	AA55	N/A	N/A	N/A	**START CHECKWORD**
3,4	15 - 0	BIN	1 - 366	DAYS	LSB = 1	CTFS	**EXTENDED BIT COMPLETION TIME DAY**
5	7 - 0	BIN	0 - 23	HOURS	LSB = 1	CTFS	**EXTENDED BIT COMPLETION TIME HOURS**
6	7 - 0	BIN	0 - 59	MINS	LSB = 1	CTFS	**EXTENDED BIT COMPLETION REPORT TIME MINUTES**
7	7 - 0	BIN	0 - 59	SECS	LSB = 1	CTFS	**EXTENDED BIT COMPLETION TIME SECONDS**
8	7 - 0	N/A	N/A	N/A	N/A	N/A	SPARE
9 - 12	31 - 0	BIN	0 - 1 per bit	N/A	N/A	N/A	**TEST RESULTS** Reports LRUs suspect as a result of extended BIT.
	0		0 or 1				1 = MCP LRU SUSPECT
	1		0 or 1				1 = IEEE - 488 LRU SUSPECT
	2		0 or 1				1 = TIME (MOD) LRU SUSPECT
	3		0 or 1				1 = TDIF LRU SUSPECT
	4		0 or 1				1 = ACQ LRU SUSPECT
	5		0 or 1				1 = PNP LRU SUSPECT
	6		0 or 1				1 = TIME (DEMOD) LRU SUSPECT
	7		0 or 1				1 = DMDP LRU SUSPECT
	8		0 or 1				1 = DMSS LRU SUSPECT
	9		0 or 1				1 = RFDC3 LRU SUSPECT
	10		0 or 1				1 = SYNTH (DEMOD) LRU SUSPECT
	11		0 or 1				1 = SYNTH (MOD) LRU SUSPECT
	12		0 or 1				1 = TMOD LRU SUSPECT
	13		0 or 1				1 = EXCS LRU SUSPECT
	14		0 or 1				1 = 5V (PS1/PS2) LRU SUSPECT
	15		0 or 1				1 = RF5V (PS1) LRU SUSPECT
	16		0 or 1				1 = 12 V (PS2) LRU SUSPECT
	17		0 or 1				1 = 15 V (PS1) LRU SUSPECT
	18		0 or 1				1 = HIGH UNIT TEMPERATURE
	19		0 or 1				1 = EBNO LRU SUSPECT
	20		0 or 1				1 = BERT (CMD) LRU SUSPECT
	21		0 or 1				1 = BERT (I) LRU SUSPECT
	22		0 or 1				1 = BERT (Q) LRU SUSPECT
	23		0 or 1				1 = TIC (I) LRU SUSPECT
	24		0 or 1				1 = TIC (Q) LRU SUSPECT
	25 - 29						SPARES
	30		0 or 1				1 = TEST COMPLETE 0 = TEST INCOMPLETE
	31		0 or 1				1 = TEST FAILED 0 = TEST PASSED

PTE_EXTENDED_BIT_REPORT (CONT)

BYTE #	BIT #S	TYPE	RANGE	UNITS	RESOLUTION	ACCURACY	DESCRIPTION
13 - 16	31 - 0	BIN	0 or 1 per bit	N/A	N/A	N/A	**VME TEST RESULTS BY LRU** Reports LRU suspects as a result of the VME test.
(Refer to MCP TEST RESULTS BY LRU for LRU bit map)							
17 - 20	31 - 0	BIN	0 or 1 per bit	N/A	N/A	N/A	**TIME TEST RESULTS BY LRU** Reports LRU suspects as a result of the TIME test.
(Refer to MCP TEST RESULTS BY LRU for LRU bit map)							
21 - 24	31 - 0	BIN	0 or 1 per bit	N/A	N/A	N/A	**DMDP TEST RESULTS BY LRU** Reports LRU suspects as a result of the DMDP test.
(Refer to MCP TEST RESULTS BY LRU for LRU bit map)							
25 - 28	31 - 0	BIN	0 or 1 per bit	N/A	N/A	N/A	**DEMOD ASIC TEST RESULTS BY LRU** Reports LRU suspects as a result of the DEMOD ASIC test.
(Refer to MCP TEST RESULTS BY LRU for LRU bit map)							
29 - 32	31 - 0	BIN	0 or 1 per bit	N/A	N/A	N/A	**SIGNAL LEVEL TEST RESULTS BY LRU** Reports LRU suspects as a result of the SIGNAL LEVEL test.
(Refer to MCP TEST RESULTS BY LRU for LRU bit map)							
33 - 36	31 - 0	BIN	0 or 1 per bit	N/A	N/A	N/A	**PNP TEST RESULTS BY LRU** Reports LRU suspects as a result of the PNP test.
(Refer to MCP TEST RESULTS BY LRU for LRU bit map)							

PTE_EXTENDED_BIT_REPORT (CONT)

BYTE #	BIT #S	TYPE	RANGE	UNITS	RESOLUTION	ACCURACY	DESCRIPTION
37 - 40	31 - 0	BIN	0 or 1 per bit	N/A	N/A	N/A	**CORR TAP TEST RESULTS BY LRU** Reports LRU suspects as a result of the CORR TAP test.
(Refer to MCP TEST RESULTS BY LRU for LRU bit map)							
41 - 44	31 - 0	BIN	0 or 1 per bit	N/A	N/A	N/A	**TDIF TEST RESULTS BY LRU** Reports LRU suspects as a result of the TDIF test
(Refer to MCP TEST RESULTS BY LRU for LRU bit map)							
45 - 48	31 - 0	BIN	0 or 1 per bit	N/A	N/A	N/A	**IEEE—488 CONTROLLER TEST RESULTS BY LRU** Reports LRU suspects as a result of the IEEE - 488 Controller test
(Refer to MCP TEST RESULTS BY LRU for LRU bit map)							
49 - 52	31 - 0	BIN	0 or 1 per bit	N/A	N/A	N/A	**IEEE—488 INSTRUMENTS TEST RESULTS BY LRU** Reports LRU suspects as a result of the IEEE - 488 Instruments test
(Refer to MCP TEST RESULTS BY LRU for LRU bit map)							
53 - 56	31 - 0	BIN	0 or 1 per bit	N/A	N/A	N/A	**RF LOOPBACK TEST RESULTS BY LRU** Reports LRU suspects as a result of the RF Loopback test
(Refer to MCP TEST RESULTS BY LRU for LRU bit map)							
57 - 60	31 - 0	BIN	N/A	N/A	N/A	N/A	SPARE
61 - 62	31 - 0	BIN	N/A	N/A	N/A	N/A	SPARE
63 - 64	15 - 0	HEX	55AA	N/A	N/A	N/A	**END CHECKWORD**

PTE_BER/TIC/E_b/N_o_MEASUREMENTS_REPORT

Description: Reports results of BER Test/ Time Interval Measurement and E_b/N_o Status. Report contains error conditions, test completion status, and BER/TIC measurements and E_b/N_o calibration and error status.

BER Measurements are collected at a 1 pps rate, asynchronous with the BER Test Interval. The BERT holds the “latest” BER measurement until requested by the 488. If more than one Test Interval occurs during a 1 pps report rate, then only the last of these measurements is reported to as status.

BER Status is the state of the BERT when the measurement report is requested. It does not correlate to the measurement being reported, but is truly a snapshot (taken during the 1 pps) of the BERTs condition.

Format:

PTE_BER/TIC/E_b/N_o_MEASUREMENTS_REPORT (CONT)

BYTE #	BIT #S	TYPE	RANGE	UNITS	RESOLUTION	ACCURACY	DESCRIPTION
1,2	15 - 0	HEX	AA55	N/A	N/A	N/A	**START CHECKWORD**
3,4	15 - 0	BIN	1 - 366	DAYS	LSB = 1	CTFS	**REPORT TIME DAY**
5	7 - 0	BIN	0 - 23	HOURS	LSB = 1	CTFS	**REPORT TIME HOURS**
6	7 - 0	BIN	0 - 59	MINS	LSB = 1	CTFS	**REPORT TIME MINUTES**
7	7 - 0	BIN	0 - 59	SECS	LSB = 1	CTFS	**REPORT TIME SECONDS**
8	7 - 0		N/A	N/A	N/A	N/A	**BER TEST COMPLETE STATUS**
	0		0 - 1	N/A	N/A	N/A	1 = TEST COMPLETE CMD BERT
	1		0 - 1	N/A	N/A	N/A	1 = TEST COMPLETE RTN I BERT
	2		0 - 1	N/A	N/A	N/A	1 = TEST COMPLETE RTN Q BERT
	3 - 7		0 - 1	N/A	N/A	N/A	SPARES
9,10	15 - 0	BIN	0 OR 1 per bit	N/A	N/A	N/A	**BERTS ERROR CONDITION FLAGS**
	0		0 - 1	N/A	N/A	N/A	1 =NO SYNC - CMD BERT
	1		0 - 1	N/A	N/A	N/A	1 =NO CLK - CMD BERT
	2		0 - 1	N/A	N/A	N/A	1 =NO DATA - CMD BERT
	3		0 - 1	N/A	N/A	N/A	1 = OVERFLOW - CMD BERT
	4		0 - 1	N/A	N/A	N/A	SPARE
	5		0 - 1	N/A	N/A	N/A	1 =NO SYNC - RTN I CHANNEL BERT
	6		0 - 1	N/A	N/A	N/A	1 =NO CLK - RTN I CHANNEL BERT
	7		0 - 1	N/A	N/A	N/A	1 = NO DATA - RTN I CHANNEL BERT
	8		0 - 1	N/A	N/A	N/A	1 = OVERFLOW - RTN I BERT
	9		0 - 1	N/A	N/A	N/A	SPARE
	10		0 - 1	N/A	N/A	N/A	1 =NO SYNC - RTN Q CHANNEL BERT
	11		0 - 1	N/A	N/A	N/A	1 =NO CLK - RTN Q CHANNEL BERT
	12		0 - 1	N/A	N/A	N/A	1 =NO DATA - RTN Q CHANNEL BERT
	13		0 - 1	N/A	N/A	N/A	1 = OVERFLOW - RTN Q BERT
	14		0 - 1	N/A	N/A	N/A	SPARE
	15		N/A	N/A	N/A	N/A	SPARE

PTE_BER/TIC_MEASUREMENTS_REPORT (CONT)

BYTE #	BIT #S	TYPE	RANGE	UNITS	RESOLUTION	ACCURACY	DESCRIPTION
11,12	15 - 0	BIN	10^{-10} to 1	BER	N/A	+/- 1/2 CNT	**CMD CHANNEL BIT ERROR RATE MEASUREMENT**
							$BER = M \times 10^{-E}$
(11)	7 - 0	BIN	0 - 9	N/A	N/A	N/A	(E)xponent (negative)
(12)	7 - 0	BIN	0 - 99	N/A	.1	N/A	(M)antissa
13,14	15 - 0	BIN	0 - 1	BER	N/A	+/- 1/2 CNT	**RETURN I CHANNEL BIT ERROR RATE MEASUREMENT**
							$BER = M \times 10^{-E}$
(13)	7 - 0	BIN	0 - 10	N/A	N/A	N/A	(E)xponent (negative)
(14)	7 - 0	BIN	0 - 99	N/A	.1	N/A	(M)antissa
15,16	15 - 0	BIN	0 - 1	BER	N/A	+/- 1/2 CNT	**RETURN Q CHANNEL BIT ERROR RATE MEASUREMENT**
							$BER = M \times 10^{-E}$
(15)	7 - 0	BIN	0 - 9	N/A	N/A	N/A	(E)xponent (negative)
(16)	7 - 0	BIN	0 - 99	N/A	.1	N/A	(M)antissa

PTE_BER/TIC/E_bN_o_MEASUREMENTS_REPORT (CONT)

BYTE #	BIT #S	TYPE	RANGE	UNITS	RESOLUTION	ACCURACY	DESCRIPTION
17	7 - 0	BIN	0 - 1 per bit	N/A	N/A	N/A	**TIME INTERVAL STATUS**
	0		0 - 1	N/A	N/A	N/A	1 = MEAS INITIATED I
	1		0 - 1	N/A	N/A	N/A	1 = MEAS VALID I
	2		0 - 1	N/A	N/A	N/A	1 = ERROR I (error/overflow)
	3		0 - 1	N/A	N/A	N/A	1 = MEAS INITIATED Q
	4		0 - 1	N/A	N/A	N/A	1 = MEAS VALID Q
	5		0 - 1	N/A	N/A	N/A	1 = ERROR Q (error/overflow)
	6,7						spares
18	7 - 0		BIN	N/A	N/A	N/A	E_b/N_o STATUS
			0				1 = E_b/N_o Tracking Out Of Range
			1				1 = E_b/N_o Calibration Sequence Busy
			2 - 7				spares
19 - 22	31 - 0		100 - 10^{10}	nsec	100	+/- 100ns	**TIME MEASUREMENT I**
							+/- trigger error
							+/- Time Bias Err x T.I.
23 - 26	31 - 0		100 - 10^{10}	nsec	100	+/- 100ns	**TIME MEASUREMENT Q**
							+/- trigger error
							+/- Time Bias Err x T.I.
27 - 28	15 - 0	HEX	55AA	N/A	N/A	N/A	**END CHECKWORD**

SECTION H7
END—TO—END COMMUNICATIONS CONTROL LEVEL

H7.1 GENERAL

This section describes the interactions of the End - to - End Communications Control Level of the MODEM PTE - SSC / ADPE interface (interaction 3 of Figure H4 - 1).

H7.2 BLOCKING

Data shall be blocked in an even number byte format. No command or report shall contain more than 64 bytes, so that it will fit into a single 1553 transfer. Each command and report shall begin with a START CHECKWORD of AA55 HEX, and end with an END CHECKWORD of 55AA HEX. Since each command is identified by its subaddress location in the PTE, no command ID need be contained within the End - to - End data message.

H7.3 PTE ILLEGAL COMMAND REPORTING

H7.3.1 SYNCHRONOUS COMMANDS

H7.3.1.1 Not Accepted

Synchronous commands shall be rejected via the COMMAND NOT ACCEPTED parameter in the PERFORMANCE REPORT if:

a. The command is received with insufficient setup time (insufficient notification) as specified in table H5 - 1.

b. The command is received more than 1 hour in advance of the effective time.

c. The command contains an effective time in the past.

d. The command was received in an invalid subaddress

e. The command contained an incorrect block size (see blocking)

f. There was incomplete configuration data provided to execute that command.

H7.3.1.2 Not Executed

Synchronous commands shall be rejected via the COMMAND NOT EXECUTED parameter in the PERFORMANCE REPORT if:

a) the command ’s effective time occurred during an unallowed state as specified by the IR COMMAND STATE TABLE, Table H5 - 2.

b) command execution of that command is already in progress at the effective time of the new command. Execution times are specified in Table H5 - 1.

Should the time between receiving commands of the same type be less than the setup time, the unit shall NOT lockup or malfunction. The unit may, however, overwrite the previous command. This shall not be reported.

H7.3.2 ASYNCHRONOUS COMMANDS

Asynchronous commands shall be rejected via the COMMAND NOT ACCEPTED or COMMAND NOT EXECUTED parameter in the PERFORMANCE REPORT if:

a. The command was received during an invalid state (see Table H5 - 2 for valid states).

b. The command was received in an invalid subaddress

c. The command contained an incorrect block size (see blocking)

d. There was incomplete configuration data provided to execute that command.

e. Ephemeris protocol error

f. Incorrect ephemeris table size

H7.3.3 INVALID COMMAND PARAMETERS

Invalid Command Parameters (Out - of - Range value or undefined option selection) shall not cause a command to be rejected, nor shall it cause a unit malfunction. Instead, the command shall be executed using default parameter values for each invalid parameter received.

H7.4 INVALID REPORT TIME TAGS

In the case where the report time tags cease to increment (except EXTENDED BIT REPORT), the ADPE shall assume after two successive time tag failures, that the PTE has had a CPU failure. The ADPE shall initiate a failover in response to this error.

SECTION H8
NETWORK/TRANSPORT CONTROL LEVEL

H8.1 GENERAL

This section describes the Network/Transport Control Level interactions of the PTE - SSC / ADPE interface: PTE - SSC and SSC - ADPE (interactions 4 and 5 of Figure H4 - 1).

H8.2 PTE — SUBSYSTEM CONTROLLER

H8.2.1 DATA BLOCK / BYTE MAP

All message formats (commands and status) are defined in bytes. The MSB is transmitted first in accordance with MIL - STD - 1553B. The message format of the bytes is such that the first to last parameter and the MSB to LSB is in the BYTE order of 1 to N respectively. The mapping of bytes #'s to 1553 words is shown in Figure H8 - 1.

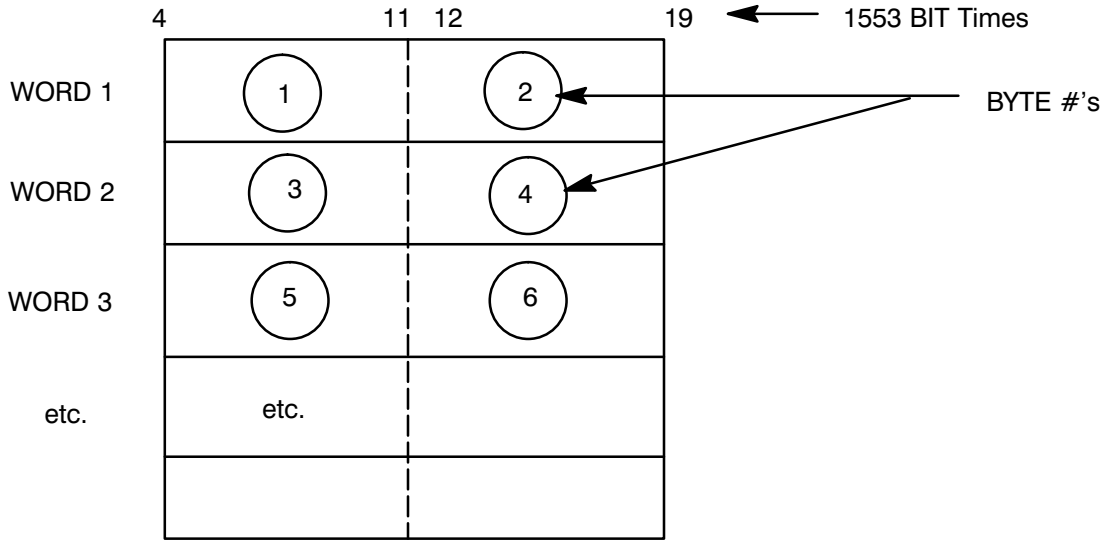

Figure H8—1. Data Transfers

As this is the exact blocking of the data being transmitted and received by the ADPE (excluding the applications header defined in HE - 06 - 1), the messages to and from the PTE from the SSC shall be a direct pass through. Table H8 - 1 shows the PTE command message block sizes. Table H8 - 2 shows the PTE report message block sizes.

TABLE H8—1. PTE COMMAND MESSAGE BLOCK SIZES

COMMAND	BLOCK SIZE (# 1553 WORDS)
SET STATE	4
GENERAL CONFIGURATION	3
DOWNLOAD (EPHEMERIS | FIRMWARE)	6
MOD CONFIGURATION	29
MOD START SERVICE	4
MOD START RTN BER TEST	8
MOD MEASURE TIME INTERVAL	7
DEMOD SPECIFIC CONFIGURATION	14
DEMOD COMMON CONFIGURATION	10
DEMOD START ACQUISITION	2
DEMOD START PN MODEL	4
DEMOD START FWD BER TEST	5
DEMOD RANGE CHANNEL REACQUISITION	2
EPHEMERIS DATA BLOCKS	6 + (# POINTS X # TABLES X 2) { MAX # WORDS = 9606 }

TABLE H8—2. PTE REPORT MESSAGE BLOCK SIZES

REPORT	BLOCK SIZE (# 1553 WORDS)
MOD CONFIGURATION REPORT	29
MOD PERFORMANCE REPORT	14
DEMOD CONFIGURATION REPORT	21
DEMOD PERFORMANCE REPORT	25
GENERAL STATUS REPORT	10
BER/TIC MEASUREMENTS REPORT	14
EXTENDED BIT REPORT	32

H8.2.2 1553 SUBADDRESSES

Subaddress values 0 or 31 shall indicate the presence of a mode code command in the Data Word Count/Mode Code field of the command word. Subaddress values 1 through 29 shall be available to identify Command and Report block messages, as described in the Commands and Reports paragraphs. The presence of an unused subaddress value shall cause the command word to be considered illegal. Illegal commands shall be processed as described in the Illegal Command Word paragraph.

H8.2.3 COMMAND SUBADDRESS IDENTIFICATION

Commands shall be identified by means of uniquely assigned MIL - STD - 1553 subaddresses, as per the Command Message Subaddress, Table H8 - 3. The remote terminals shall use the subaddress value within the received command word as an index to store each received message into a dedicated message buffer.

The subaddresses of the MIL - STD - 1553 messages comprising the download Ephemeris data block shall sequence through values of 20 and 29, as required. The first message of a download data block shall have a subaddress of 20. The Download Command shall specify the download type (Ephemeris or Firmware) and word size of the ensuing download data block. Other Commands may be interspersed with the download data block messages. If the data block contains more words than can fit in subaddresses 20 - 29, then the block shall repeat subaddresses 20 through 29 sequentially.

TABLE H8—3. COMMAND MESSAGE SUBADDRESSES

COMMAND	SUBADDRESS		
	IR	MDP	PTE
SET STATE	1	1	1
COMMON CONFIGURE (IR / MDP / PTE DEMOD)	2	2	2
SPECIFIC CONFIGURE (IR / PTE MOD)	3	N/A	3
SPECIFIC CONFIGURE (MDP / PTE DEMOD)	N/A	4	4
COLD START	5	N/A	N/A
FORWARD BREAK LOCK	6	6	N/A
DOWNLOAD (EPHEMERIS | FIRMWARE)	7	7	7
FORWARD FREQUENCY SWEEP	8	8	N/A
START ACQUISITION	9	N/A	9
START SERVICE	N/A	10	10
FORWARD DOPPLER COMP CONTROL	11	11	N/A
START FWD BER TEST	N/A	N/A	12
START RTN BER TEST	N/A	N/A	13
START FORWARD MODEL	14	N/A	14
MEASURE TIME INTERVAL	N/A	N/A	15
ZERO DOPPLER COUNT	16	N/A	N/A
EXPANDED FREQUENCY SEARCH	17	N/A	N/A
BURN ALERT	18	N/A	N/A
GENERAL CONFIGURE (PTE)	N/A	N/A	18
RANGE CHANNEL REACQUISITION	N/A	N/A	19
DOWNLOAD DATA BLOCKS	20 - 29		
RESERVED (DATA WRAP - AROUND)	30		
MODE CODE COMMANDS	0, 31		

H8.2.4 REPORT SUBADDRESS IDENTIFICATION

Reports shall be identified by means of uniquely assigned MIL - STD - 1553 subaddresses, as per the Report Message Subaddresses, Table H8 - 4. The SSC transmit command shall contain a subaddress that the remote terminals shall use as an index to select the desired Report message for transmission to the SSC.

TABLE H8—4. REPORT MESSAGE SUBADDRESSES

REPORT	SUBADDRESS		
	IR	MDP	PTE
TRACKING/TIME TRANSFER	1	1	N/A
SPECIFIC CONFIGURATION, MDP / PTE MOD	N/A	2	2
SPECIFIC CONFIGURATION, IR / PTE DEMOD	3	N/A	3
PERFORMANCE, PTE / PTE DEMOD	4	N/A	4
PERFORMANCE, MDP / PTE MOD	N/A	5	5
EXTENDED BIT	6	6	6
GENERAL STATUS REPORT	N/A	N/A	7
BER MEASUREMENTS	N/A	N/A	8
COMMON CONFIGURATION, MDP	N/A	9	N/A
COMMON CONFIGURATION, IR	10	N/A	N/A
SPARE	11 - 29		
RESERVED (DATA WRAP - AROUND)	30		

H8.2.5 PTE POWER–UP INITIALIZATION

Upon power - up or reset, the PTE will enter its Confidence Test In Progress State. During this state, there shall be a maximum of 10 seconds, where the PTE does not respond over the 1553 bus.

H8.2.6 MESSAGE ERROR HANDLING

In response to a 1553 message error flag in the 1553 status word, the SSC shall retransmit the message to the PTE one time. Should a second message error occur, the SSC shall report the error to the ADPE as described in paragraph H8.3.3.

H8.2.7 REMOTE TERMINAL ADDRESS

The PTE RT address shall be determined via an external harness cable.

H8.3 SUBSYSTEM CONTROLLER — ADPE

H8.3.1 DATA BLOCK / BYTE MAP

The PTE message blocks shall be transferred between the SSC and the ADPE as per paragraph H8.2.1. ADPE applications header (as per HE - 06 - 1) shall be stripped off of commands prior to sending to the PTE. Status report blocks, when reported to the ADPE, shall be provided in a status table as described in HE - 06 - 1 paragraphs 6.1.1, 6.2.2, and 6.3.1 for SSA, MA, and KSA respectively.

H8.3.2 MESSAGE ROUTING

H8.3.2.1 Commands

A UNIT COMMAND MNEMONIC shall be passed to the SSC by the ADPE as part of the command header defined in HE - 06 - 1. The UNIT COMMAND MNEMONIC shall specify the subaddress of the command being sent on to the unit. The command header shall be represented by 2 binary bytes, representing the subaddress, with the LSB contained in bit time 19 of the 1553 word. The mapping of UNIT COMMAND MNEMONICS to subaddresses is shown in Table H8 - 3.

H8.3.2.2 Ephemeris Downloading

Two commands are transmitted during an ephemeris download; the DOWNLOAD_CMD and the EPHEMERIS_DATA_CMD. A UNIT COMMAND MNEMONIC shall be passed to the SSC by the ADPE as part of the command header defined in HE - 06 - 1, for each of the commands. The UNIT COMMAND MNEMONIC shall be represented by 2 binary bytes, representing the subaddress, with the LSB contained in bit time 19 of the 1553 word. The DOWNLOAD_CMD shall precede the EPHEMERIS_DATA_CMD, not necessarily contiguously, and the DOWNLOAD_CMD shall be sent on the NORMAL command subaddress defined in HE - 06 - 1 Section 9. The SSC may use the DOWNLOAD_CMD as notification that the there is ephemeris data to follow on the LARGE data capacity subaddresses as defined in HE - 06 - 1. The UNIT COMMAND MNEMONIC of the DOWNLOAD_CMD shall identify that command by the unit subaddress, specified in Table H8 - 3. For the EPHEMERIS_DATA_CMD, the UNIT COMMAND MNEMONIC shall specify the first unit subaddress of the ephemeris data being sent on to the unit (i.e., “20”). This subaddress shall

identify that this is the first block of ephemeris data. The SSC shall transmit all succeeding data to the unit in accordance with paragraph H8.2.3. The mapping of commands to subaddresses is shown in Table H8 - 3.

H8.3.2.3 Status Reports

The reports to be collected shall be specified by the Status Table Bit Map as defined in HE - 06 - 1 paragraphs 6.1.1.1, 6.2.1.1, and 6.3.1.1. Based on this selection, the SSC shall collect status from the appropriate subaddresses, which are specified for each of the reports in Table H8 - 4. No subaddresses shall be supplied by the ADPE for status collection.

H8.3.3 SSC – PTE 1553 BUS MESSAGE ERROR REPORTING

Lack of PTE bus response (due to problem or power - up) or receipt of message error after retry shall be reported to the ADPE via a once per second SSC status table, as defined in the Format Control Level of HE - 06 - 1,Appendix C.

SECTION H9
LINK CONTROL LEVEL

H9.1 GENERAL

This section describes the Link Control Level interactions of the PTE - SSC interface (interaction 6 of Figure H4 - 1).

H9.2 MODE CODES

Nine mode code commands shall be provided to support interface diagnostic procedures and dual redundant support. Table H9 - 1 lists the supported mode codes.The mode code command processing shall conform to MIL - STD - 1553, as described below. The mode code command rate shall not exceed one per second.

TABLE H9—1. SUPPORTED MODE CODES

COMMAND	MODE CODES (BITS 15—19)
TRANSMIT STATUS WORD	00010 (2)
INITIATE SELF TEST	00011 (3)
TRANSMITTER SHUTDOWN	00100 (4)
OVERRIDE TRANSMITTER SHUTDOWN	00101 (5)
INHIBIT TERMINAL FLAG	00110 (6)
OVERRIDE INHIBIT TERMINAL FLAG	00111 (7)
RESET REMOTE TERMINAL	01000 (8)
TRANSMIT LAST COMMAND	10010 (18)
TRANSMIT BIT WORD	10011 (19)

The Transmit Bit command shall cause the remote terminal to transmit its status word followed by a single data word containing the remote terminal's BIT data. The data word, containing the remote terminal BIT data, shall not be altered by the reception of a transmit last command or a transmit status word mode code. The next status word access shall reflect any errors in BIT word transmission. The format of the remote terminal's BIT Word format shown in Table H9 - 2.

TABLE H9—2. REMOTE TERMINAL BIT WORD FORMAT

BIT	MEANING
15 (MSB)	LOGIC “0”
14	LOGIC “0”
13	CHANNEL B TRANSMITTER TIMEOUT
12	CHANNEL A TRANSMITTER TIMEOUT
11	CHANNEL B LOOP TEST FAILURE
10	CHANNEL A LOOP TEST FAILURE
9	CHANNEL B TRANSMITTER SHUTDOWN
8	CHANNEL A TRANSMITTER SHUTDOWN
7	NON - MODE BROADCAST COMMAND TO TRANSMIT
6	MESSAGE ABORT - HIGH WORD COUNT
5	MESSAGE ABORT - LOW WORD COUNT
4	ILLEGAL MODE CODE OR ILLEGAL BRDCST W/ MODE CODE
3	MODE CODE OR TRANSMIT/RECEIVE BIT ERROR
2	A/B LOOP TEST FAILURE
1	HANDSHAKE FAILURE
0 (LSB)	A/B TRANSMITTER FAILURE

H9.3 1553 STATUS WORD

The supported status bits are listed in Table H9 - 3. The other status bits shall be spared, and their value not guaranteed.

TABLE H9—3. SUPPORTED STATUS BITS

STATUS BIT FUNCTION	STATUS WORD BIT TIME
Message Error	9
Terminal Flag	19

H9.3.1 MESSAGE ERROR

The Message Error bit shall be set as per the 1553B standard to indicate that the preceding received bus controller message was in error. The validation criteria shall include those for invalid messages (data and command word validation, transmission continuity, and word count verification).

H9.3.2 TERMINAL FLAG

The Terminal Flag bit shall be set by the remote terminal when it detects a bit error during data transmission. This shall be accomplished by means of its loop - back data monitoring feature. During data transmission, the last word of each MIL - STD - 1553 message transmitted from the remote terminal shall be verified. The last word of each message shall be locally looped - back

through the receive circuitry of the remote terminal. The transmitted and 'received' copies of the message's last word shall be bit - by - bit compared to detect any transmission errors. If a transmission error is detected, the remote terminal shall set the Terminal Flag bit in its status word.

H9.3.3 1553 RECEPTION FAILURES

The Remote Terminal data reception of Invalid Command Word and Invalid Data Receptions shall be handled as per the 1553B standard.

SECTION H10
PHYSICAL LEVEL

The physical interface (Interaction 7 of Figure H4 - 1) between the SSCs and the PTE for each service shall be as defined in paragraphs of HE - 06 - 2 listed below.

IR HWCI	SSC HWCI	HE - 06 - 2 Paragraph
SSA EQUIPMENT	SSA CONTROL	23, 27, 36
MA RCVR/XMIT	MA CONTROL	23, 27, 36
KSA LOW DATA RATE	KSA CONTROL	23, 27, 36